

**BRITISH COLUMBIA
MINISTRY OF FORESTS**

**Morice
Timber Supply Area**

**Rationale for
Allowable Annual Cut (AAC)
Determination**

Effective October 1, 2002

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AAC Rationale for the Morice TSA

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Objective of this document

This document is intended to provide an accounting of the factors I have considered and the rationale I have employed as chief forester of British Columbia in making my determination, under Section 8 of the *Forest Act*, of the allowable annual cut (AAC) for the Morice Timber Supply Area (TSA). This document also identifies where new or better information is needed for incorporation in future determinations.

Description of the TSA

The Morice TSA is located in northwestern British Columbia and covers about 1.5 million hectares, extending from the most northerly tip of Babine Lake in the north to Ootsa and Whitesail lakes in the south. The boundaries of the Morice TSA correspond with those of the Morice Forest District, one of six districts in the Prince Rupert Forest Region. The TSA is administered by the forest district office in Houston.

The population of the Morice TSA is about 5,600 according to the 1996 census, a nine per cent decrease since 1991. The main community is Houston, which is home to about three-quarters of the TSA's population. The remainder of the population lives in smaller communities such as Topley and Granisle, or on the many ranches and farms along the Highway 16 corridor and in the area from Owen Lake to Francois Lake.

History of the AAC

In 1981, the first comprehensive timber supply analysis was completed and based on this information the AAC was set at 2 000 000 cubic metres. In 1996, the chief forester determined the AAC to be 1 985 815 cubic metres, a level which essentially maintained the previous AAC after accounting for 14 185 cubic metres issued to woodlot licences.

The AAC is currently apportioned by the Minister of Forests as follows:

Apportionment	Cubic metres/year	percentage
Forest licences – replaceable	1 778 380	89.6
Timber sale licences – all types	184 870	9.3
Forest Service reserve	16 750	0.8
Woodlot licences	5 815	0.3
Total	1 985 815	100.0

New AAC determination

Effective October 1, 2002 the new AAC for the Morice TSA will be 1 961 117 cubic metres.

This AAC excludes the volume issued to woodlots since the 1996 determination, and is otherwise unchanged from the previous AAC.

This determination will remain in effect until a new AAC is determined, which may take place within five years.

Information sources used in the AAC determination

Information considered in determining the AAC for the Morice TSA include the following:

- *Morice TSA Data Package and Information Report*, BCFS, March 2001;
- *Morice TSA Analysis Report and Public Discussion Paper*, BCFS, February 2002;
- *Morice TSA Summary of Public Input on Data Package and TSA Analysis Report*, BCFS, September 2002;
- Letter from the Minister of Forests to the chief forester, dated July 28, 1994, stating the Crown's economic and social objectives for the province;
- Memorandum from the Minister of Forests to the chief forester, dated February 26, 1996, stating the Crown's economic and social objectives for the province regarding visual resources;
- *Morice TSA Rationale for AAC determination*, BCFS, October 1996;
- *Morice TSA Timber Supply Analysis*, BCFS, February 1996;
- *Forest Practices Code of British Columbia Act*, consolidated to May 2002,
- *Forest Practices Code of British Columbia Act Regulations and Amendments*, current as of May 2002;
- *Forest Practices Code of British Columbia Guidebooks*, BCFS and MELP;
- *Regional Landscape Unit Strategy for the Prince Rupert Forest Region*, BCFS, approved December 1997;
- *Morice TSA Inventory Audit*, BCFS Inventory Branch, February 1998;
- *Landscape Unit Planning Guide*, BCFS and MELP, March 1999;
- *Forest Practices Code Timber Supply Analysis*, 1996;

Role and limitations of the technical information used

Section 8 of the *Forest Act* requires the chief forester to consider biophysical as well as social and economic information in AAC determinations. A timber supply analysis, and the inventory and growth and yield data used as inputs to the analysis, typically form the major body of technical information used in AAC determinations. Timber supply analyses and associated inventory information are concerned primarily with biophysical factors—such as the rate of timber growth and definition of the land base considered available for timber harvesting—and with management practices.

However, the analytical techniques used to assess timber supply are necessarily simplifications of the real world. There is uncertainty about many of the factors used as inputs to timber supply analysis due in part to variations in physical, biological and social conditions, although ongoing science-based improvements in the understanding of ecological dynamics will help reduce some of this uncertainty.

Furthermore, technical analytical methods such as computer models cannot incorporate all of the social, cultural and economic factors that are relevant when making forest management decisions. Therefore, technical information and analysis do not necessarily provide complete answers or solutions to forest management problems such as AAC determinations. The information does, however, provide valuable insight into potential impacts of different resource-use assumptions and actions, and thus forms an important component of the information required to be considered in AAC determinations.

In determining the AAC for the Morice TSA, I have considered known limitations of the technical information provided, and I am satisfied that the information provides a suitable basis for my determination.

Statutory framework

Section 8 of the *Forest Act* requires the chief forester to consider particular factors in determining AACs for TSAs and TFLs. Section 8 is reproduced in full as Appendix 1.

Guiding principles for AAC determinations

Rapid changes in social values and in our understanding and management of complex forest ecosystems mean that there is always some uncertainty in the information used in AAC determinations. In making a large number of determinations for many forest management units over extended periods of time, administrative fairness requires consistency when addressing these changes and associated uncertainties. To make my approach in these matters explicit, I have set out the following body of guiding principles. If in some specific circumstance it is necessary to deviate from these principles, I will provide a detailed reasoning in the considerations that follow.

Two important ways of dealing with uncertainty are:

- (i) minimizing risk, in respect of which in making AAC determinations, I consider the uncertainty associated with the information before me, and attempt to assess the various potential current and future social, economic and environmental risks associated with a range of possible AACs; and
- (ii) redetermining AACs frequently, in cases where projections of short-term timber supply are not stable to ensure they incorporate current information and knowledge—a principle that has been recognized in the legislated requirement to redetermine these AACs every five years. The adoption of this principle is central to many of the guiding principles that follow.

In considering the various factors that Section 8 of the *Forest Act* requires me to take into account in determining AACs, I attempt to reflect as closely as possible operability and forest management factors that are a reasonable extrapolation from current practices. It is not appropriate to base my decision on unsupported speculation with respect either to factors that could work to increase the timber supply—such as optimistic assumptions about harvesting in unconventional areas, or using unconventional technology, that are not substantiated by demonstrated performance—or to factors that could work to reduce the timber supply, such as integrated resource management objectives beyond those articulated

in current planning guidelines or the *Forest Practices Code of British Columbia Act* and its associated regulations (the Forest Practices Code).

The *Forest Practices Code of British Columbia Regulations* were originally approved by the Lieutenant Governor in Council on April 12, 1995, and released to the public at that time. The *Forest Practices Code of British Columbia Act* was brought into force on June 15, 1995.

Although the Forest Practices Code has been fully implemented since the end of the transition period on June 15, 1997, the timber supply implications of some of its provisions, such as those for landscape-level biodiversity, still remain uncertain, particularly when considered in combination with other factors. In each AAC determination I take this uncertainty into account to the extent possible in context of the best available information.

The eventual timber supply impacts associated with land-use decisions resulting from the various planning processes — including the Protected Areas Strategy, Land and Resource Management Planning (LRMP), and other area-based planning processes — are often discussed in relation to current AAC determinations. Since the outcomes of these planning processes are subject to significant uncertainty before formal approval by government, it has been and continues to be my position that in determining AAC's it would be inappropriate to attempt to speculate on the timber supply impacts that will eventually result from land-use decisions not yet taken by government. Thus I do not account for possible impacts of existing or anticipated recommendations made by such planning processes, nor do I attempt to anticipate any action the government could take in response to such recommendations.

Moreover, even where government has made a formal land-use decision, it may not always be possible to fully analyze and account for the consequent timber supply impacts in a current AAC determination. In many cases, government's land-use decision must be followed by a number of detailed implementation decisions. For example, a land-use decision may require the establishment of resource management zones and resource management objectives and strategies for these zones. Until such implementation decisions are made it would be impossible to fully assess the overall impacts of the land-use decision. Nevertheless, the legislated requirement for five-year AAC reviews will ensure that future determinations address ongoing plan implementation decisions. However, where specific protected areas have been designated by legislation or by order-in-council, these areas are deducted from the timber harvesting land base and are no longer considered to contribute to the timber supply in AAC determinations.

A number of intensive silviculture activities that have been undertaken in the past have the potential to affect timber supply, particularly in the long term. As with all components of my determinations, I require sound evidence before accounting for the effects of intensive silviculture on possible harvest levels. Nonetheless, I will consider information on the types and extent of planned and implemented practices as well as relevant scientific, empirical and analytical evidence on the likely magnitude and timing of any timber supply effects of intensive silviculture.

Some have suggested that, given the large uncertainties present with respect to much of the data in AAC determinations, any adjustments in AAC should wait until better data are

available. I agree that some data are not complete, but this will always be true where information is constantly evolving and management issues are changing. Moreover, in the past, waiting for improved data created the extensive delays that resulted in the urgency to redetermine many outdated AAC's between 1992 and 1996. In any case, the data and models available today are superior to those available in the past, and will undoubtedly provide for more reliable determinations.

Others have suggested that, in view of data uncertainties, I should immediately reduce some AAC's in the interest of caution. However, any AAC determination I make must be the result of applying my judgement to the available information, taking any uncertainties into account. Given the large impacts that AAC determinations can have on communities, no responsible AAC determination can be made solely on the basis of a response to uncertainty. Nevertheless, in making my determination, I may need to make allowances for risks that arise because of uncertainty.

With respect to First Nations' issues, I am aware of the Crown's legal obligations resulting from recent decisions in the British Columbia Court of Appeal and the Supreme Court of Canada. The AAC that I determine should not in any way be construed as limiting the Crown's obligations under these decisions. In this respect it should be noted that my determination does not prescribe a particular plan of harvesting activity within the Morice TSA. My determination is also independent of any decision by the Minister of Forests with respect to subsequent allocation of the wood supply.

The British Columbia Court of Appeal decided in March 2002 that pending the final determination of the existence of aboriginal rights and title, the Crown has an obligation to consult with First Nations with respect to asserted rights and title in a manner proportional to the strength of the interests. I consider any information brought forward respecting First Nations' interests. In particular I consider information related to actions taken to protect interests, including operational plans that describe forest practices designed to seek to address such First Nations' interests. In this context, I re-iterate that my AAC determination does not prescribe a particular plan of harvesting activity, nor does it involve allocation of the wood supply to any particular party.

If, subsequent to this determination, I become aware of information respecting First Nations interests that would substantially alter the estimate of timber supply underlying my determination, I may revisit my determination.

Overall, in making AAC determinations, I am mindful of the mandate of the Ministry of Forests as set out in Section 4 of the *Ministry of Forests Act* and of my responsibilities under the *Forest Practices Code of British Columbia Act* and the *Forest Act*.

The role of the timber supply analysis

In considering the factors required under Section 8 of the *Forest Act* to be addressed in AAC determinations, I am assisted by timber supply forecasts provided to me through the timber supply review process.

For each AAC determination for a TSA, a timber supply analysis is carried out using an information package including data and information from three categories—land base

inventory, timber growth and yield, and management practices. Using this set of data and a computer model (Forest Stand Simulator, or FSSIM), a series of timber supply forecasts is produced, reflecting different starting harvest levels, rates of change over time, and potential trade-offs between short- and long-term harvest levels.

From this range of forecasts, one is chosen which attempts to avoid excessive changes from decade to decade and significant timber shortages in the future, while ensuring the long-term productivity of forest lands. This is known as the 'base case' forecast, and forms the basis for comparison when assessing the effects of uncertainty on timber supply.

Because it represents only one in a number of theoretical forecasts, and because it incorporates information about which there may be some uncertainty, the base case forecast for a TSA is not an AAC recommendation. Rather, it is one possible forecast of timber supply, whose validity—as with all the other forecasts provided—depends on the validity of the data and assumptions incorporated into the computer simulation used to generate it.

Therefore, much of what follows in the considerations outlined below is an examination of the degree to which all the assumptions made in generating the base case forecast are realistic and current, and the degree to which its predictions of timber supply must be adjusted, if necessary, to more properly reflect the current situation.

These adjustments are made on the basis of informed judgement, using current available information about forest management, which may well have changed since the original information package was assembled. Forest management data is particularly subject to change during periods of legislative or regulatory change, such as the enactment of the Code, or during the implementation of new policies, procedures, guidelines or plans.

Thus it is important to remember, in reviewing the considerations which lead to the AAC determination, that while the timber supply analysis with which I am provided is integral to those considerations, the AAC determination itself is not a calculation but a synthesis of judgement and analysis in which numerous risks and uncertainties are weighed. Depending upon the outcome of these considerations, the AAC determined may or may not coincide with the base case forecast. Judgements that may be based in part on uncertain information are essentially qualitative in nature and, as such, are subject to an element of risk. Consequently, once an AAC has been determined, no additional precision or validation may be gained by attempting a computer analysis of the combined considerations to confirm the exact AAC determined.

Timber supply analysis for the Morice TSA

The base case harvest forecast presented in the *February 2002 Morice Timber Supply Area Analysis Report* incorporated the best available information on current forest management, land base and timber yields for the TSA. It included specific assumptions related to the implementation of the Forest Practices Code, interim landscape units and draft biodiversity emphasis options, scenic corridors, and other management direction arising from the Telkwa Caribou Recovery Area Plan and Morice Local Resource Use Plan.

These assumptions are discussed in the aforementioned timber supply analysis report. In this rationale, I will discuss many of those assumptions in the context of my considerations

for this AAC determination. However, where my review of an assumption has concluded that I am satisfied it was appropriately modelled in the timber supply analysis, I will not discuss my considerations in detail in this document unless there is a high level of public input or lack of clarity in the data package or analysis report.

With the factors described above and others appropriate to the TSA incorporated, a 'base case' was generated and submitted for public review. The initial harvest level assumed for the base case forecast was 1 961 117 cubic metres per year. This harvest level represented the current AAC, less 24 698 cubic metres issued to woodlots since the previous determination. The base case harvest forecast projected that a harvest level of 1 961 117 cubic metres per year could be maintained for four decades followed by a one time reduction of approximately eight percent to achieve a long-term harvest level of 1 803 000 cubic metres per year.

There were specific considerations consistent with current timber supply review policies that led to the choice of the 2002 base case forecast. These considerations included striving to achieve an initial harvest level reflecting the current AAC, as well as providing for an orderly transition in harvesting from existing natural stands to future managed stands. Alternative harvest forecasts were considered and are discussed later in this document.

I have considered the reasoning used to select the base case forecast and I am satisfied that it provides a suitable basis from which to evaluate the assumptions regarding land base, management practices and timber yields for the Morice TSA. I have also considered all public input received on the data package and analysis report, and where appropriate I have discussed my considerations under the various factors presented in this rationale.

Consideration of Factors as Required by Section 8 of the *Forest Act*

Section 8 (8)

In determining an allowable annual cut under subsection (1) the chief forester, despite anything to the contrary in an agreement listed in section 12, must consider

(a) the rate of timber production that may be sustained on the area, taking into account

(i) the composition of the forest and its expected rate of growth on the area,

Land base contributing to timber harvesting

- general comments

As part of the process used to define the timber harvesting land base in the timber supply analysis, a series of deductions are made from the productive forest land base. These deductions account for the factors that effectively reduce the suitability or availability of the productive forest area for harvest, due to ecological, economic or social reasons.

In the Morice TSA, the deductions (summarized in table 2 of the *February 2002 Morice Timber Supply Area Analysis Report*) result in a timber harvesting land base of 683 962 hectares, or approximately 71 percent of the Crown productive forest land.

Those factors associated with deriving the timber harvesting land base for which I accept the assumptions applied in the analysis are not discussed below unless there is a high level of public input or lack of clarity in the data package or analysis report. Where my consideration of the information has identified a factor which in my estimation requires discussion in this document, it is described below.

- economic and physical operability

Those portions of the TSA, which are neither physically accessible nor economically feasible to harvest, are categorized as inoperable, and are excluded when deriving the timber harvesting land base. In my previous AAC determination for the Morice TSA, I instructed district staff to identify operability lines on mapsheets within the TSA. Since then, district staff have undertaken two projects to define the inoperable areas of the TSA.

The first project involved a review of operational plans to determine the maximum elevation at which logging occurs. The review indicated that only small portions of a few existing and proposed cut blocks have occurred above 1360 metres (4000 feet). Based on the results of this project, all stands occurring above 1360 metres in elevation (18 526 hectares of forested land base) were excluded from the timber harvesting land base in the analysis.

The second project involved the identification of areas that would not likely be harvested due to high development costs, relatively low stand volumes and harvesting priorities to address forest health in other parts of the TSA. Based on this assessment, an additional 26 081 hectares of forested land were excluded from the timber harvesting land base.

Areas identified as inoperable on the inventory file (2966 hectares of forested land base) were also excluded from the analysis as harvesting has generally not occurred in these areas.

Input from licensees stated that some stands occurring above 1360 metres in elevation could in fact be harvestable. Licensee staff point out that portions of some existing and approved blocks are located above 1360 metres in elevation. They expressed the opinion that high elevation harvesting has not occurred due to the placement of harvesting priorities on stands at lower elevations to address forest health concerns. It was suggested that the capability of the site to produce a new forest, minimum stand volume, or other merchantability criteria should be used determine economic operability, rather than a static elevation line. With regard to the exclusion of areas with high development cost and low volumes, concern was raised that the data package did not provide enough information for licensee staff to provide their opinion on the exclusions. Licensee staff suggested that high cost areas be included in the base case and excluded in sensitivity analysis.

I have considered the licensee input and discussed the concerns with district staff. With regard to the exclusion of the areas above 1360 metres in elevation, I believe that it is likely these areas are primarily poorer growing sites, marginally economic and more difficult to regenerate. Although, district staff agree that there are some portions of existing cut blocks above 1360 metres in elevation, it was felt that this elevation limit approximated the upper limits of current logging practices well. In the case of areas harvested above 1360 metres, it was felt that an equivalent amount of area below that elevation would not be harvested.

To date, there is very little harvesting above 1360 metres and overall I am satisfied with the analysis assumption that harvesting will not occur above this elevation.

I am aware that a sensitivity analysis examined the impact of adding all high development cost areas back into the timber harvesting land base. The results of the sensitivity analysis indicate that, if these areas could contribute to timber supply, the initial harvest level could be 2.3 percent higher than that of the base case. However, from my review of the information, I believe it is likely that most of the high development cost areas cannot be harvested as they are generally inaccessible, of low volume and have a high proportion of unmerchantable forest types. I therefore accept that these areas were appropriately excluded from the timber harvesting land base.

I commend district staff for their efforts on the two projects to better define physical and economic operability, and note that the refinement of the information afforded by these projects is an improvement from previous assessments of operability. I also encourage licensee staff to continue to assess performance in high elevation and high development cost areas, and if the data indicates a change in the assumptions is appropriate, then provide it for use in the next timber supply analysis.

In the meantime, I believe that the criteria used to define the physically and economically operable land base reasonably approximates where harvesting is expected to occur and is suitable for use in this determination. I make no adjustments to the assumptions for physical and economically operability in this determination.

- environmentally sensitive areas

Environmentally sensitive area (ESA) data identifies areas sensitive to disturbance and/or with significant value for fisheries, wildlife, water or recreation resources. Areas with ESA classifications of Es1 (highly sensitive soils), Ep1 (areas difficult to regenerate), Ea1 (avalanche areas), Er1 (high value recreation areas – see discussion on recreation), and Ew1 (sensitive wildlife areas) are entirely excluded from the timber harvesting land base. Twenty percent of areas with Es2 (moderately sensitive soils) classification were also removed in the analysis. Approximately 110 000 hectares of forested land were excluded from the timber harvesting land base to account for environmentally sensitive areas, with most attributable to Es1 (54 374 hectares) and Ep1 (48 365 hectares) classifications. It was noted that little harvesting has occurred in all areas classified as ESA 2 when compared to the TSA timber harvesting land base overall.

Terrain stability mapping (TSM) is available for 98 of the 142 mapsheets within the Morice TSA. Morice district staff carried out a study to evaluate whether TSM should be used in place of ESA soils classifications, to identify and remove areas with sensitive soils from the analysis. The study indicated that TSM polygons and Es1 polygons corresponded well in location and shape. However, TSM did not capture areas classified as Es2. Given that the TSM did not cover the mountainous southern portion of the TSA, and areas classified as Es2 were not captured by the TSM, the district staff choose to use ESA classifications for soils to exclude areas of sensitive soils in the analysis.

Licensee staff suggested that TSM should have been used, where available, to replace ESA soils classifications as the higher resolution of the TSM data make it the best available

information. Canadian Forest Products staff compared 96 mapsheets that had both TSM and ESA classifications for soils, and concluded that TSM more accurately reflected the area of steep terrain and sensitive soils. With regard to concerns that the TSM does not identify ESA areas classified as Es2, licensees suggested that other criteria used to determine the timber harvesting land base might account for areas identified as Es2, making the explicit removal of these areas unnecessary.

I have considered the licensee input and discussed the concerns with district staff. I accept the reductions for all ESA classifications other than soils are appropriate. With regards to the land base reductions for soils, I note that in other units, I have typically accepted TSM to be better information than ESA mapping. As a result, in some TSAs with a partial TSM, I have accepted the extrapolation of the TSM soils reductions to unmapped portions of the TSA. However, I note that this would be difficult in the Morice TSA given that the most mountainous portion of the TSA has not yet been mapped for terrain stability.

I also acknowledge that licensees and district staff are more familiar with how ESA mapping relates to harvesting restrictions on the ground. As TSM is fairly new, there is still uncertainty around how much area within each TSM classification can be logged.

On balance however, it is more likely that reductions to the forested land base to reflect soils sensitivity would have been smaller had TSM been used in place of ESA soils mapping. A 96 mapsheet comparison of ESA soils mapping to the partially completed TSM provided by Canadian Forest Products staff suggests that the timber harvesting land base would have up to 2.5 percent larger had TSM been used in place of ESA soils mapping.

In consideration of the information, I feel that the timber harvesting land base has indeed been somewhat under estimated on this account. However, I expect that the underestimation resulting from the use of ESA soils mapping is likely less than 2.5 percent for two reasons. First, the most mountainous portion of the TSA was not part of the 96 mapsheet comparison and probably contains a larger proportion of unstable area than the comparison area. Second, it is likely that at least some of the areas classified as potentially unstable would preclude timber harvesting (in addition to only the unstable areas assumed in the comparison). If for example, one were to assume 50 percent of the TSM areas classified as potentially unstable preclude harvesting, in addition to the unstable areas, the land base would be increased by only 1.3 percent (relative to the using ESA mapping). I expect that this represents the bottom end of the range, because it is unlikely that more than half of potentially unstable areas would preclude harvest.

In summary, I think it is likely that the timber harvesting land base has been underestimated by between 1.3 to 2.5 percent as a result of using ESA soils mapping rather than TSM mapping. For now, I am putting weight on the lower end of the range until performance is demonstrated relative to the new TSM classifications. I accept that the timber harvesting land base and thus timber supply has been underestimated by about 1.5 percent and I will consider this further under 'Reasons for decision'. I request that district staff and licensees work to complete terrain stability mapping for the remainder of the TSA and assess performance in the various TSM categories so that this information can be incorporated.

- unmerchantable forest types

Stands that are physically operable yet are not currently utilized because of low timber quality or value are referred to as problem or unmerchantable forest types. This does not imply that these types of forests are not important in terms of their role and function in the ecosystem because they do contribute to meeting biodiversity requirements in the analysis.

Virtually all unmerchantable forest types eliminated from the timber harvesting land base were either hemlock or deciduous-leading stands. To confirm these stands are not being harvested operationally, district staff reviewed two data sources. First, forest development plans (proposed cutblocks) were reviewed, to ensure unmerchantable stands excluded in the analysis were not being harvested on a large scale. Less than 0.4 percent of the area proposed for harvest was found to be in unmerchantable forest types. Secondly, scale returns were examined (1997-2001) to see how much volume scaled was of species considered unmerchantable for this analysis. Very little unmerchantable species volume was scaled over a five-year period, with hemlock being the most significant at 0.02 percent of the harvest. This small amount of hemlock volume harvested is likely the result of harvesting in spruce- or balsam-leading stands with a secondary component of hemlock. In the analysis, hemlock volume as a secondary component was included in the yield estimates used in this analysis.

Input from Houston Forest Products suggested that species considered unmerchantable, for this analysis, are presently marketable and should be included in the timber harvesting land base if they meet minimum productivity criteria. However, the review described above clearly indicates no performance in these stands.

I acknowledge that there maybe an opportunity to harvest some additional volume in the Morice TSA if performance can be demonstrated in hemlock and deciduous forest types. Given the current lack of harvesting in the stands considered that were unmerchantable in this analysis, I am satisfied that criteria used were reasonable. If licensees demonstrate increased performance in unmerchantable forest types, then such stands could be incorporated in the timber harvesting land base for future analyses.

- sites with low timber growing potential

Sites with low productivity resulting from inherent site factors such as nutrient availability, thin soils and lack of or excess of moisture are excluded from the timber harvesting land base as harvesting is unlikely to occur in these stands. In my last determination I noted that there was uncertainty around the low productivity site exclusions and directed district staff to continue to monitor harvesting performance on low productivity sites and review minimum productivity criteria.

In the 2002 supply analysis for the Morice TSA, low productivity sites occupied by spruce, subalpine fir (balsam) or lodgepole pine-leading stands were excluded from the timber harvesting land base if minimum site index criteria (productivity requirements) were not met. For the data package, minimum site index criteria were developed based on district staff expectations of how much volume stands needed to accumulate before harvesting could occur. This minimum volume was determined to be 200 cubic metres for balsam and 150 cubic metres for spruce and pine stands. If the productivity of a site was so low that

growth would not meet the minimum volume at a specified stand age (200 years for balsam and 150 years for spruce and pine), it was excluded from the timber harvesting land base unless the site had been previously logged.

Input from Houston Forest Products staff suggested that any stand meeting the minimum volume criteria, as defined by district staff, should be considered merchantable regardless of age. They indicated that they have harvested some low site stands as defined in the data package, and thought that this would also be the case for other licensees.

Considering the input from Houston Forest Products, BCFS staff examined the characteristics of stands within forest development plans to refine site productivity criteria to be used in the analysis. Minimum site index criteria were chosen to ensure virtually all of the forest development plan areas would be retained in the timber harvesting land base if the criteria were applied. This review resulted in changes in the minimum site index criteria used in the analysis to less than 8.0 metres for balsam and spruce stands and 12 metres for lodgepole pine.

Having reviewed the information used to define sites with low timber growing potential for the analysis, I note that the minimum site requirement for spruce and balsam appear reasonable at 8 metres. I feel the minimum site index used for lodgepole pine might be high at 12.0 meters but, I have no data to indicate that this value is unreasonable for this unit. In any event, even if the site index for lodgepole pine stands was reduced to that used to exclude other species, the timber harvesting land base would increase by only 17 000 hectares or 2.5 percent. For this determination, I am satisfied that the assumptions used to exclude sites with low growing potential were appropriate.

I congratulate staff for their efforts to refine minimum site index criteria using forest development plans. Over the next 5 years, I encourage district staff to continue to assess licensee performance on low productivity sites, and if appropriate to provide data for use in the next timber supply analysis.

- roads, trails and landings

In the analysis, reductions were applied to account for the permanent loss of productive forest area to roads, trails and landings. Reductions were made to reflect both existing roads, trails and landings and those required in the future to complete access structures within the Morice TSA.

To account for existing roads and trails in the analysis, district staff digitally mapped these permanent road structures and they were spatially excluded from the timber harvesting land base, for a total of 6213 hectares. To estimate the area attributable to existing landings, staff examined silvicultural reports to see how much of the area within cutblocks was reported as permanent reductions. Permanent reductions within cutblocks totalled 4.2 percent of the cutblock area, and staff assumed 50 percent of this area, or 2.1 percent of the cutblock area, was attributable to landings. The other 2.1 percent of cutblock area associated with permanent reductions is attributable to roads and trails which are already accounted for in the road and trail mapping exercise. As a result of the review, the total area excluded to account for landings was 3 854 hectares.

To account for future roads, trails and landings, the proportion of the timber harvesting land base within the TSA that has been developed relative to undeveloped (still needs roads to access) was estimated. The area within existing roads, trails and landings was then prorated to reflect the area yet to be developed within the TSA. This resulted in a further 19 171 hectares being excluded from the timber harvesting land base.

Input from licensees suggested that trails had been accounted for twice as they are currently included in the area to be reforested within a cutblock and Operational Adjustment Factors are applied to managed stands to account for small unproductive areas within stands.

Licensees point out that most of the volume within the Morice TSA is now harvested using roadside logging techniques and suggested that that area attributed to future landings needed to be greatly reduced. Canadian Forest Products staff provided some data that indicated landings only represented 1.4 percent of gross cutblock area for the 365 cutblocks harvested in the past 5 years. However, they also mentioned that total permanent access structures represented 5.4 percent of gross area within the same cutblocks. They suggested that the area in permanent access structures attributable to landings be reduced for future estimates, but that the area removals for roads be increased.

I have considered the information presented and note that the mapping of existing roads and trails by district staff has greatly improved the ability to accurately account for existing roads and trails in this analysis. The reductions for existing landings, associated with stands harvested in the past, also seem reasonable.

The area removed from the timber harvesting land base to reflect future landings appears high, (2.1 percent of cutblock area) and seems to be dropping as licensees move to more roadside logging. However, it appears that the amount of road construction associated with roadside logging is increasing, possibly of a magnitude similar to, or greater than, the area removed in the analysis to reflect future landings. I note that one licensee's data indicated that the permanent access structures represent 5.4 percent of gross cutblock area under roadside logging versus the 4.2 percent recorded historically for the TSA. I also note that 29 238 hectares of forested land base is removed to reflect permanent access structures in this analysis. This represents 4.3 percent of the timber harvesting land base, and this is a significant decrease from the 7.8 percent used in the previous analysis.

For now I accept that the area excluded to account for permanent access structures appears reasonable although I accept there is uncertainty in these estimates. I recommend that the district staff and licensees review these reductions prior to the next analysis to ensure they are updated to reflect current trends and data.

Existing forest inventory

Forest cover disturbance (primarily harvesting) information was updated to 1993 (13 mapsheets), 1995 (36 mapsheets), or 1998 (93 mapsheets) prior to initiation of the timber supply analysis. Forest cover disturbance was further updated by the analyst using existing cutblock information from forest development plans, which were current to either 1998 or 1999. Forest growth was projected to the end of 2000.

In order to control the current bark beetle infestation, small patches of forest are harvested for brood removal but these depletions are not shown in the inventory. Brood removal areas accounted for 2045 openings in 2001, each less than one hectare in size and 215 655 cubic metres of harvest (approx. 1/10 of the current harvest). The location of these openings are mapped but not yet reflected in the forest cover inventory. It is expected that over time these small openings will be absorbed into larger cutblocks and reflected in the inventory at that time.

Input from licensees expressed concern that the analysis was using forest cover inventory information that was not current for depletions and does not accurately reflect the current age class distribution of stands on the land base.

I acknowledge the licensees' concerns regarding depletions and strongly support the district's efforts to bring inventory up-to-date. I note that inventory depletions have been partially addressed through the use of forest development plan information, which addresses depletions to 1998 or 1999 for the analysis. I note this determination occurs about 3 to 4 years into the first decade of the analysis horizon and therefore the decrease to the mid-term harvest level shown in the base case will occur in approximately 36 rather than 40 years from now.

I also note that brood removal activities have been going on for more than 10 years and few of these depletions are not reflected in the inventory. If I assume 200 000 cubic metres of harvest annually for brood removal over a ten-year period, then approximately 2.0 million cubic metres of harvesting depletions are not recorded in the inventory. This represents about 1.5 percent of the growing stock at the start of the analysis, and would result in moving the decrease in the mid-term harvest level, shown in the base case, forward about 10 years earlier than forecast.

I request that district and licensee staff work to update depletions for both regular, and brood removal harvesting activities prior to the next analysis. In this determination, I have considered the cumulative impact of regular and brood removals not being properly reflected in the inventory and, as a result, conclude that the drop in the future harvest level of 8.0 percent will occur about 14 years sooner than projected in the base case (26 rather than 40 years from now). I will discuss my considerations of this further under 'Reasons for decision'.

- existing stand volume estimates

Volumes for existing natural stands (in which species and stocking have not been managed) were estimated and projected using forest inventory attributes and the Variable Density Yield Prediction (VDYP) model which was developed by the former BCFS Resources Inventory Branch (now the Terrestrial Information Branch, Ministry of Sustainable Resource Management).

For the Morice TSA, the 1998 inventory audit suggested that inventory estimates of volumes for forested stands over 60 years of age are within 1 percent of actual volumes on the ground. For stands considered operable in the previous timber supply analysis, inventory volumes are overestimated by 4.6 percent; however, this difference was not

statistically significant and the definition of operable land has changed considerably from the last analysis.

A *Tomentosus* root disease study (spruce root rot) conducted in spruce-leading stands over 80 years of age (18 percent of the timber harvesting land base) found endemic losses in 11 of 50 randomly sampled stands. Volume losses to root disease were estimated at 0.74 cubic metres per hectare for stands older than 80 years. However, a comparison of inventory volumes for sampled stands to volumes measured in the study indicated that endemic losses attributable to spruce root disease are currently reflected in VDYP volume estimates used in the analysis.

I have considered the information about existing stand volume estimates and discussed it with regional and district staff. I note that *Tomentosus* root disease losses appear to be accounted for by VDYP but, would encourage the re-measurement of these 50 sample locations prior to the next analysis, to confirm that losses to *Tomentosus* do not result in ground volumes falling below VDYP volume predictions. Although the inventory audit indicated that volumes in operable stands may have been overestimated by 4.6 percent, I do not put weight on the results for this determination as the difference is not statistically significant. I make no adjustments for this determination to existing volume estimates.

Expected rate of growth

I have considered the information regarding the projected volumes for managed stands, including the various operational adjustment factors, minimum harvest age criteria and genetic gains applied in the analysis. I am satisfied that the analysis assumptions were appropriate in this regard and I will not discuss my considerations of these factors in this rationale, with the exception of site productivity estimates and modelling of silviculture treatments that have been applied to stands older than 34 years, as discussed under "Silvicultural systems and treatments" below.

- site productivity estimates

Inventory data includes estimates of site productivity for each forest stand. Site productivity is expressed in terms of a site index, which is based on the stand's height as a function of its age. The productivity of a site largely determines how quickly trees grow, which in turn affects the time seedlings will take to reach green-up conditions, the volume of timber that can be produced, and the age at which a stand will reach a merchantable size.

The most accurate estimates of site productivity come from stands between 30 and 150 years old. At ages less than 30 years, (particularly stands less than 15 years) the growth history of trees has not been long enough to give accurate measurements of site productivity using site curves and inventory estimates of height and age. Site productivity estimates derived for older stands also tends to be underestimated as stands are well past the age of maximum height growth and have often been affected by disease, insects and top damage, as they reach an advanced age. The underestimation of site productivity has been verified in several areas of the province where studies—such as the Old-Growth Site Index (OGSI) 'paired plot' project and the 'veteran' study—as well as results from projects assigning site index estimates via ecosystem classification systems, suggest that actual site indices may be

higher than those indicated from inventory estimates. These studies confirm that when old stands are harvested and regenerated, site productivity realized is generally higher than inventory-based site index estimates would predict.

Localized site productivity adjustment equations have been developed for the majority of lodgepole pine sites in the Morice TSA and were refined subsequent to their application in the last analysis. These site productivity adjustments were applied to lodgepole pine-dominated stands in the SBSmc2 and SBSdk biogeoclimatic variants in the base case analysis. These site productivity adjustments were applied to both existing managed stands and natural stands following harvest and regeneration. Site index values for regenerating balsam and spruce stands were taken from the forest inventory files as no local site index studies are available for these species.

Input from Canadian Forest Products staff noted that localized productivity adjustments had also been applied to lodgepole pine stands in the SBSwk3 biogeoclimatic subzone/variant in the previous analysis (2.7 percent of lodgepole pine stands) and questioned why it had not been applied in this analysis. BCFS staff noted that localized productivity adjustments were not applied to lodgepole pine stands in the SBSwk3 variant due to the lack of plots in these types.

In addition to the site index adjustments applied in the base case, sensitivity analysis was used to assess the impact to timber supply if site productivity is underestimated for non-adjusted stands' in the order of magnitude suggested by the OGSi studies. Site index adjustments were applied to stands older than 140 years of age, whose site indices had not been adjusted using localized equations (4.6 percent of lodgepole pine, 49.4 percent of spruce and 68.3 percent of balsam stands). Managed stand volumes along with minimum harvestable ages and green-up ages were adjusted to reflect OGSi productivity adjustments. The sensitivity analysis results indicate that the current harvest rate can be maintained for 10 decades before increasing to 2.04 million cubic metres per year in the long-term, 13 percent over the base case.

Having considered the information, and availability of local data, I am satisfied that the adjustments applied in the base case for lodgepole pine stands were appropriate.

Given existing silvicultural requirements, it is reasonable to expect that full stocking will occur in the majority of managed stands in the Morice TSA, and that the stands will be managed to minimize losses to pests and competing vegetation. Therefore, while the exact magnitude of the productivity increase is not certain, I believe it is highly reasonable to expect that most second-growth stands will grow faster than productivity estimates on the inventory file would suggest. In this determination, I have considered the implications of an underestimation for timber supply on this account, and that the timber supply in the mid-to long-term is likely greater than projected in the base case. I will discuss my considerations of this further under 'Reasons for decision'.

I note that local site productivity data for managed spruce and balsam stands will provide much needed certainty around the magnitude of site productivity adjustments appropriate for the Morice TSA, and I encourage the collection of data.

- (ii) the expected time that it will take the forest to become re-established on the area following denudation,

Expected time for forest to be re-established following harvest

I have reviewed the information regarding regeneration, regeneration delay and impediments to regeneration and I am satisfied that the assumptions in the analysis for these factors were appropriate. As a result, I will not discuss my considerations of these factors in this rationale.

-not-satisfactorily-restocked areas

Not-satisfactorily-restocked (NSR) areas are those where timber has been removed, either by harvesting or by natural causes, and a stand of suitable tree species and stocking has yet to be established. Areas where a suitable stand had not been regenerated and the site was disturbed after 1987, are classified as 'current' NSR. Where a suitable stand has not been regenerated and the site was disturbed before 1987, the classification is 'backlog' NSR.

I have discussed the NSR figures used in the analysis with district staff and conclude that they are reasonable. I note that the analysis shows a current NSR figure of 16 930 hectares, which validates the 2 year regeneration delay assumed in the analysis (over 7 000 hectares annually in the TSA). For the 5 595 hectares of backlog NSR represented in the analysis, 2977 hectares is assumed to be treated and regenerate on a managed stand yield curve 10 years after the start of the analysis, and 2616 hectares is assumed to be left without treatment and regenerate to an unmanaged stands yield curve also after 10 years.

District staff confirm that treatment had already occurred on some of the backlog NSR areas, and I am satisfied with the assumptions in the analysis around treated NSR. I expect, however, that untreated backlog NSR areas will grow at a rate well below that of existing unmanaged stands, as stocking on these areas is very sparse and clumped in distribution. I will assume that the productivity of untreated backlog NSR areas will be 50 percent that of natural stands for purposes of the determination, which can be equated to a 1308 hectare loss in area for the first rotation. The impact of this loss would be a reduction of about 0.2 percent to mid-term timber supply. I will discuss my considerations of this further under 'Reasons for Decision'.

- (iii) silviculture treatments to be applied to the area,

Silvicultural systems and treatments

I have reviewed the information regarding silvicultural systems and I am satisfied that the base case assumptions for this factor was appropriate.

Incremental silviculture treatments in managed stands consist primarily of spacing. Managed stands yield curves are constructed on the assumption that stands are free to grow at their potential and thus spacing treatments aimed at maintaining productivity are reflected in the analysis.

For the analysis, it was assumed that stands greater than 34 years of age would be considered unmanaged and placed on a unmanaged stand yield curve. Input from licensees

noted that some stands older than 34 years that had been spaced or spaced and fertilized should be projected on a managed stand yield curve.

District staff confirm that 2239 hectares of 40-60 year old stands have been spaced and 2100 hectares of stands have been spaced and fertilized. I acknowledge that these stands, particularly those spaced and fertilized, will grow faster than assumed in the analysis. While the stand level impact of these treatments is likely significant, I note that only 0.6 percent of the timber harvesting land base is affected. If for example it was assumed that yields would be improved by 30 percent for these stands, the mid- and long-term, harvest level would be increased by about 0.2 percent. I will discuss my considerations of this further under 'Reasons for decision'.

- (iv) the standard of timber utilization and the allowance for decay, waste and breakage expected to be applied with respect to timber harvesting on the area

Timber Harvesting

I have reviewed the information regarding the utilization standards assumed in the analysis for the Morice TSA, and I am satisfied that they were appropriately modelled in the analysis.

- allowances for decay, waste and breakage

When trees are harvested, some volume losses occur due to stem breakage as trees are felled. As well, trees are sometimes affected by organisms that cause decay. These volume losses are accommodated in the analysis through the use of provincial decay, waste and breakage allowances applied to yield curves. In the last determination I instructed staff to monitor decay, waste and breakage in mature and old-growth balsam stands, as concern has been expressed that losses might exceed provincial averages. It is still unclear whether balsam decay, waste and breakage losses differ from the provincial averages, as no new data are available to verify losses.

For this analysis, I accept the provincial average allowances for decay, waste and breakage used in the base case as the best available information at the current time.

Monitoring of losses to decay, waste and breakage in balsam stands might well be handled under the Innovative Forest Practices Agreement currently in place in the Morice TSA. I will again review decay, waste and breakage losses in the next analysis and consider any new information at that time.

- (v) the constraints on the amount of timber produced from the area that reasonably can be expected by use of the area for purposes other than timber production,

Integrated resource management objectives

The Ministry of Forests is required under the *Ministry of Forests Act* to manage, protect and conserve the forest and range resources of the Crown and to plan the use of these resources so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realization of fisheries, wildlife, water, outdoor recreation and other

natural resource values are coordinated and integrated. Accordingly, the extent to which integrated resource management (IRM) objectives for various forest resources and values affect timber supply must be considered in AAC determinations.

To manage for resources such as water quality and aesthetics, current harvesting practices limit the size and shape of cutblocks and amount of disturbance (areas covered by stands of less than a specified height), and prescribe minimum green-up heights for regenerated stands on harvested areas before adjacent areas may be harvested. Green-up requirements provide for a distribution of harvested areas and retention of forest cover in a variety of age classes across the landscape.

In the timber supply analysis, as described in the February 2002 *Morice Timber Supply Area Analysis Report*, management zones were created and different forest cover constraints were applied to the stands in each zone. These management zones—Morice LRUP Zone A, visual quality (4 zones), caribou management and standard management—were developed to reflect different operational considerations.

I have reviewed the information presented to me regarding the analysis assumptions for cutblock adjacency/green-up and stand level biodiversity. I am satisfied that the base case forecast has appropriately reflected current practice within these areas. As a result, I will not discuss my considerations of these factor in this rationale. The factors discussed below are those for which I believe my consideration requires some documentation.

- visually sensitive areas

Careful management of scenic areas along travel corridors and near recreational sites is an important IRM objective. The Forest Practices Code enables the management of visual resources by providing for scenic areas to be identified and made known by the district manager or through a higher level plan, and by providing for the establishment of visual quality objectives (VQO).

To achieve objectives for visual quality, limits are placed on the amount of visible disturbance that is acceptable in visually sensitive areas. These limits act to constrain timber harvesting, road building and other forest practices. Guidelines to meet VQOs include setting a maximum percentage of a visual landscape allowed to be in a disturbed state at any one time, and setting visually effective green-up (VEG) targets that must be achieved before additional harvesting is permitted. VEG refers to the stage at which a stand of forested timber is perceived by the public to be satisfactorily greened-up from a visual stand point.

Provincial guidelines provide a range of values for maximum disturbance in each visually sensitive area. The applicable disturbance value within the range is dependent on the visual absorption capacity (VAC) of the area, which is a measure of an area's physical capacity to absorb alterations while maintaining its visual integrity. An area with a low VAC can sustain relatively less disturbance than an area with a high VAC before the visual condition is considered to be compromised.

In the Morice TSA visual quality assessments have been completed, and objectives have been recommended but not yet established under the Forest Practices Code. In the timber

supply analysis for the Morice TSA, approximately 125 000 hectares or 18 percent of the timber harvesting land base was located within recommended visual quality objective (RVQO) areas. Zones were created in the analysis for these scenic areas using the RVQO, and constraints were applied which limited the amount of productive forest area within each landscape unit that could be occupied by stands that were less than the specified green-up height.

The restrictions for visual quality objectives were applied by landscape unit and applied to the entire productive forest land area within the RVQO. The maximum allowable disturbance modelled for each RVQO was the largest acceptable disturbance value provided within the acceptable range. Four visual quality zones were modelled in the timber supply analysis: preservation, retention, partial retention and modification.

Sensitivity analysis was used to assess the impact to timber supply of reducing the level of maximum disturbance allowed in visual areas to the middle and lowest point of the range suggested under the provincial guidelines. Timber supply was not affected for the first 5-decades in either sensitivity. In the mid- and long-term, the harvest level was reduced by 3.5 percent (middle of the disturbance range) and 9.1 percent (lowest point of the disturbance range).

Licensees noted that some land classified as non-forest in the inventory and excluded from the analysis, appears to have other inventory information indicating these areas have some trees growing on them. While they are not likely to be merchantable, these areas could contribute to meeting visual quality objectives and biodiversity targets. Based on an analysis using the publication 'Procedures for Factoring Visual Resources into Timber Supply', Canadian Forest Products staff also suggested that, had slope been taken into account, the VEG height needed to meet green-up requirements in visual areas could have been reduced from 5.0 to 4.4 metres.

I have reviewed the information presented to me regarding the modelling of visual quality in the analysis and discussed it with district staff. While I acknowledge the possibility that some amount of additional forested area might be available to assist in meeting visual quality requirements and likewise that the visual green-up heights might be shorter than the 5 metres assumed in the analysis, I note disturbance was modelled at the maximum of the range suggested by provincial guidelines. This is already a quite optimistic consideration with respect to minimizing operational constraints on timber supply and until such time as more operational experience is gained with respect to managing visually sensitive areas, I am unwilling to place any weight on the additional suggestions that have been made.

For the purposes of this determination, I am satisfied that the base case forecast has adequately addressed visual quality constraints as currently practised. As more harvesting experience is gained in visual areas, refinements to modelling assumptions can be made and taken into account in a future determinations as appropriate.

- wildlife habitat

Numerous wildlife species are found in the Morice TSA, including black bear, moose, deer, caribou, cougar, and fish species.

At the time of the timber supply analysis, critical wildlife habitat had only been identified in two local resource use planning areas within the TSA: the Morice Local Resource Use Plan area and the Telkwa Caribou Herd Recovery area. I discuss the analysis assumptions regarding the Morice Local Resource Use Plan later under "Local Resource Use Plan".

1) Caribou habitat

Starting in 1997 a planning project was initiated to re-introduce and permanently establish a population of Woodland Caribou to the Bulkley and Morice TSAs. As a result, the 'Interim Harvesting Guidelines for the Telkwa Caribou Herd Recovery Program' were implemented in 1999 and applied to approximately 4.2 percent of the timber harvesting land base.

The interim harvesting guidelines address key habitat management and disturbance issues in the caribou recovery area. Included in the guidelines is a forest cover requirement specifying the retention of a minimum amount of area in stands over 90 years old. In the timber supply analysis, this retention requirement for stands over 90 years old was applied to the timber harvesting land base.

Input from Canadian Forest Products staff pointed out that the forest cover requirement for caribou should apply to the forested land base rather than the timber harvesting land base.

Discussions with district staff confirmed that the caribou forest cover requirements should have been applied to the entire forested land base in the analysis (rather than just the timber harvesting land base). A sensitivity analysis was conducted to assess the timber supply impact of applying the caribou forest cover requirements to the forested land base and the results indicate that timber supply is unaffected.

Although I acknowledge that the requirements for caribou were modelled based on the timber harvesting land base rather than the forested land base, I note that the sensitivity analysis showed that accounting for this did not have any further timber supply implications and therefore I am not making any further adjustments for this factor.

2) Identified wildlife

'Identified wildlife' refers to species at risk (red- and blue-listed) and to regionally significant species which are potentially affected by forest management activities and which may not have been adequately accounted for with existing management strategies, such as those for biodiversity, riparian management, ungulate winter range or through the application of other forest cover constraints. It is hoped that by addressing the habitat needs of 'regionally important wildlife' early on, the possibility that they will become listed provincially as threatened or endangered at a later date may be avoided.

The Identified Wildlife Management Strategy (IWMS) was released in February 1999 and Volume I lists several species which may occur and which require future consideration in the Morice TSA, including the following: bull trout, American bittern, trumpeter swan, northern goshawk, fisher, grizzly bear and mountain goat.

Volume II, which has yet to be released, may identify additional species. The species identified in Volume I will be managed through the establishment of wildlife habitat

areas (WHAs) and implementation of general wildlife measures (GWMs), or through other management practices specified in higher level plans.

In the previous determination I instructed district staff, in cooperation with other Ministries, to develop a management strategy for critical and at risk wildlife. This has yet to be initiated as key non-district staff required to develop the strategy have been working on TSAs of higher priority provincially.

Based on data accumulated on the habitat requirements for the identified species, the estimated impact of management was projected at one percent of the short-term harvest level for the province. Government has committed to limiting the impact of management for identified wildlife to this level in the short-term.

It is not possible in this determination to specify the exact location or precise amount of additional habitat area that will be required within the timber harvesting land base to implement the IWMS. However, given the Province's commitment both to implement the IWMS, and to limit short-term timber supply impacts to one-percent province wide, as well as the expected occurrence of identified wildlife in this TSA, I find it appropriate to account for a one percent impact on timber supply, and I will discuss this further under 'Reasons for decision'.

I encourage the appropriate staff to work to establish WHAs and implement GWMs prior to the next determination for the Morice TSA. The establishment of these areas is a significant protective measure of the Forest Practices Code, and will assist with long-term planning and reduce operational conflicts between wildlife and harvesting.

- riparian habitat

Riparian habitats occur along streams and around lakes and wetlands. The Forest Practices Code requires the establishment of riparian reserve zones that exclude timber harvesting, and riparian management zones that restrict timber harvesting, in order to protect riparian and aquatic habitats. Stream, lake and wetland areas are described in the *Riparian Management Area Guidebook*, which provides the criteria to define riparian reserve and management zones areas for different stream, lake and wetland types.

In order to account for riparian reserve zones (RRZs) in the analysis, district staff conducted a river, stream, lake and wetland buffering and overlay process in a Geographic Information System (GIS) to deduct geographically-specific areas from the productive forest land base. The RRZs determined for each stream, lake and wetland were excluded from the timber harvesting land base in the analysis. A total of 8254 hectares of productive forest was excluded to account for RRZs

For riparian management zones (RMZs), no GIS information was available. To account for RMZs on rivers in the analysis, 85 percent of the RRZ area associated with rivers (1028 hectares) was excluded from the timber harvesting land base. No RMZ area reductions were made for smaller streams.

Input from licensees stated that harvesting of trees within RMZs on rivers is considered to be operationally viable and therefore the 1028 hectares excluded to account for RMZs does not reflect current practice. Houston Forest Products staff also asked if the exclusion for

RRZs were applied to all streams in the Nadina landscape unit as per the Local Watershed Assessment Procedures (IWAP).

District staff confirm that harvesting can occur in RMZs along rivers and, as a result, acknowledge that 1028 hectares were unnecessarily excluded in the analysis. However, they also note that some area should likely have been excluded to account for the retention of RMZs along some S4 streams. It is further noted that there are increasing instances of retention to mitigate harvest impacts on wildlife and additional unaccounted for retention of stands to reduce the windthrow hazard to RRZ areas. For the Nadina landscape unit, staff indicated that in the analysis, RRZs were not applied to all streams as per the IWAP in the analysis.

I have considered the information about riparian areas and discussed the information with district staff. I accept that the riparian reduction was based on the best available information for RRZs, but did not reflect RRZs on small streams in the Nadina landscape unit. As noted, the riparian reduction for management areas is overstated on certain rivers; however, some additional RMZ area needs to be excluded to reflect retention for wildlife management, to address windthrow concerns and to address retention of trees along some S4 streams. It is difficult to quantify the upward and downward elements within this factor, as ground data are not available to verify the reductions. However, I note that the overall removal of 9282 hectares (1.4 percent of the timber harvesting land base) looks reasonable and I will not make any adjustments on this account. For the next determination it would be useful to further evaluate recently harvested areas to assess and quantify the implication of various riparian management strategies in place at that time.

- cultural heritage resources

In the Morice TSA the primary cultural heritage resource is the large number of culturally modified trees (CMT's). The most common form of CMT found is cambium stripped lodgepole pine; with the cambium being used by First Nations people for sustenance, medicine, ceremonial and spiritual purposes. Sites containing CMTs can contain anywhere from single trees to thousands of trees.

Under the *Forest Act*, a cultural heritage resource means 'an object, a site or the location of a traditional societal practice that is of historical, cultural or archaeological significance to British Columbia, a community or an aboriginal community'. Archaeological sites that predate 1846 are protected under the *Heritage Conservation Act*. The nature and extent of required protection of archaeological sites are detailed under this legislation.

The management of cultural heritage resources within the Morice TSA is guided by the District Manager's policy on the subject. The policy directs the licensee to include in operational plan submissions a rationale that describes the impact of harvesting on the cultural heritage resource and the mitigation measures (e.g. locating CMTs within wildlife tree patches) that will be undertaken. The District Manager makes the decision regarding the significance of the feature and the need for any additional consultation. The CMT management approach used in the Morice TSA has had no significant impacts on harvesting to-date and as a result, no specific exclusions were applied in the base case

I acknowledge that protection of archaeological areas and management of other cultural heritage resources is being done appropriately in the Morice TSA. I am satisfied that current practices were appropriately reflected in the analysis and make no adjustments for this determination. As I have noted above in "Guiding Principles", no AAC that I determine should be construed as limiting in any way the Crown's obligations with respect to First Nations, and no BCFS timber supply analysis or associated AAC determination should be interpreted as prescribing any particular pattern of harvesting activity in a TSA.

- landscape-level biodiversity

Achieving landscape-level biodiversity objectives involves maintaining forests with a variety of patch sizes, seral stages, and forest stand attributes and structures, across a variety of ecosystems and landscapes. Managing for biodiversity is based in part on the principle that this—together with other provisions in the Forest Practices Code, such as riparian management, maintenance of wildlife trees, and other forest cover objectives as discussed throughout this document—will provide for the habitat needs of most forest and range organisms. A major consideration in managing for biodiversity at the landscape level is leaving sufficient and reasonably located patches of old-growth forests for species dependent on, or strongly associated with, old-growth forests.

The delineation and formal designation of 'landscape units' is a key component of a sub-regional biodiversity management strategy. For the Morice TSA, landscape unit boundaries and biodiversity emphasis options have not yet been designated. Draft boundaries were used in the analysis and the provincial weighted biodiversity emphasis averages (45 percent low, 45 percent medium and 10 percent high) were used.

Old-growth biodiversity requirements applied in the analysis were largely met in productive forests that do not contribute directly to timber supply (non-contributing forest). The non-contributing forests were subjected to disturbance in the analysis to reflect natural succession and disturbances that occur in these stands over time. Therefore, the extent to which these non-contributing forests met old-growth biodiversity requirements remains constant throughout the analysis.

Input from licensees suggested that some of the forests excluded from the analysis as non-productive, had forested attributes and could have contributed to meeting old-growth biodiversity requirements. Canadian Forest Products staff also suggested that disturbance of the non-contributing forest was unrealistic given the current practice of managing insects and suppressing fire. In their opinion, some additional non-contributing forest would likely exceed the old growth age of 250 years and be able to assist in meeting old-growth biodiversity requirements.

I have reviewed all of the information regarding landscape level biodiversity. Land classified as non-productive is not considered to contribute to biodiversity, even if it has some forested attributes, as it is generally not considered to be sufficiently useful in meeting old-growth biodiversity objectives to actually replace the function of other fully forested areas. Disturbing the non-contributing forest is appropriate given the level of insect, disease and fire activity occurring in the Morice TSA, and I consider that this approach appropriately limits the contribution of these stands to biodiversity. I also note

that very little of the timber harvesting land base is retained to meet old-growth biodiversity requirements, despite disturbing the non-contributing forest. For the purposes of this determination, I make no adjustments for this factor.

- recreation

Recreation use in the Morice TSA includes a variety of pursuits such as hiking, mountain-biking, camping, boating, horseback riding, cross-country skiing, snowmobiling, hunting and fishing. Local residents as well as tourists use the forests for recreation in the Morice TSA.

In the previous determination, I noted that minimal overlap existed between the 1991 recreation inventory and the 1986 environmentally sensitive areas inventory of high value recreation areas, and I directed staff to reconcile the two inventories. As a result, a new recreation inventory was completed in 1997 and used in this analysis.

For this analysis, both the areas identified in the 1997 recreation inventory as provincially significant and of outstanding value (classified as A0) and environmentally sensitive areas (ESAs) of high value to recreation were excluded from the timber harvesting land base. The small ESA areas of high value to recreation (Er1) were excluded in the base case as they were not captured by the larger scale 1997 recreation inventory. A total of 6503 hectares of productive forest was excluded from the timber harvesting land base to reflect recreation values.

Due to a review of harvesting activities relative to the 1997 recreation inventory, areas classified as provincially or regionally significant and requiring special management consideration (classified as A1, B1) or areas of regional significance and of outstanding value (classified as B0) were not excluded in the analysis. District staff believe that recreation values in these areas can be managed with good visual design, access management and through retention of stands associated with normal forest harvesting practices. Sensitivity analysis to assess the impact of excluding all A1, B0 and B1 recreation areas from harvesting, showed the timber harvesting land base would be reduced by about 36 000 hectares (5.3 percent) and the harvest level would drop in the second decade by 8.1 percent compared to the base case.

While logging is occurring in these recreation classifications, it appears to be at a lower intensity than other areas. Experience with management of areas classified under the new recreation inventory is limited. In consideration of the information, I think there will be some timber supply impact resulting from management of stands in A1, B0 and B1 classifications. For example, had B0 recreation areas been excluded from the timber harvesting land base, as was the case in the last analysis, an additional 7066 hectares of productive forest would have been excluded from harvest. Therefore, I believe it is likely that there is a small but unquantified overestimation of timber supply in the base case, and I have discussed this issue below under 'Reasons for decision'.

Over the term of this decision, I encourage district staff to monitor harvesting performance in recreation areas classified under the new recreation inventory. This performance data can then be used to refine recreation reductions in the next timber supply analysis.

- (vi) any other information that, in the chief forester's opinion, relates to the capability of the area to produce timber,

First Nations considerations

Six First Nations bands asserted traditional territories within the TSA, including Wet'suwet'en Nation, Lake Babine Nation, Cheslatta Carrier Nation, Wet'suwet'en First Nation (Broman Lake Band) and Skin Tyee. All of the mentioned First Nations were provided with copies of the analysis report and the public discussion papers, and were invited to provide their comments. The Wet'suwet'en Nation was the only band to respond.

The Office of the Wet'suwet'en expressed concern that continuing timber harvesting within Wet'suwet'en territories, particularly at low-elevation, is significantly affecting Wet'suwet'en culture. The Wet'suwet'en want to conduct an inventory of the cultural heritage resources remaining in their territories so they can assess the adequacy of management activities related to those values.

The Wet'suwet'en are opposed to harvesting in the Owen Lake area and submitted a petition in the 1980's to stop development in that area. There has been some harvesting throughout the petition area to deal with bark beetle control issues but, apart from this limited development has occurred.

Discussions with district staff confirm that social and cultural concerns are frequently addressed during operational planning (see section on culturally modified trees) and any new information that is developed would be considered both for operational planning and in future AAC determinations. With regards to the Owen Lake petition area, I note the concerns that have been raised but am also mindful that the area remains designated as part of the TSA and has been managed at a certain level in the past. If in the future, through the treaty negotiations or other process it is decided to either remove this area from the TSA, or, no longer consider it to be suitable for timber harvesting, then the implications of that can be considered in a future AAC determination. In the meantime, I am making no specific adjustments with respect to the Owen Lake area. Ministry staff will continue to work with Aboriginal Affairs Branch and First Nations to meet all known obligations. Based on my considerations documented above, I will make no adjustments to the base case harvest forecast at this time.

Any decisions on treaty negotiations with the First Nations that are undertaken by government will be reflected in future AAC determinations for the TSA. The AAC that I determine should not in any way be construed as limiting the Crown's legal obligations resulting from recent court decisions, including those in the Supreme Court of Canada, and in this respect it should be noted that my determination does not prescribe a particular plan of harvesting activity within the Morice TSA.

Local Resource Use Plan

The Morice Local Resource Use Plan (LRUP) was implemented in 1993 and subsequently approved by the District Manager. The LRUP was initiated to resolve conflicting timber and wildlife, flood plain stability and water quality resource issues. Zone A of the Morice

LRUP was identified as one of the highest priority areas for managing non-timber resources and was excluded from the timber harvesting land base in the last analysis.

In this analysis, Zone A areas remained in the timber harvesting land base; however, a forest cover constraint was applied limiting the area below green-up to a maximum of 1 percent of the THLB. This approach was believed to provide a better reflection of constraints on this area.

The harvesting that occurs in Zone A is related to forest health priorities and fire protection management. I have considered the information about the Morice LRUP, as I have for all the factors for my determination, and I am satisfied that what was modelled in the analysis is consistent with the intent of the plan. I therefore make no adjustments for this factor.

Innovative Forest Practices Agreement

The Morice and Lakes Innovative Forest Practices Agreement (IFPA) covers both TSAs although each TSA has separate planning processes. I have reviewed the projects undertaken and planned for the Morice TSA and recognize the objective of much of the current work is focused on development of a Sustainable Forest Management Plan intended to support certification under the Canadian Standards Association (CSA).

I acknowledge that the focus of the activities in the IFPA have centred around improving information through inventories and research and believe the IFPA is well positioned to address some of the issues highlighted during this analysis. I encourage the IFPA planning teams to consider initiating projects to address some of the issues raised during this analysis. This information can then be applied in the next AAC determination.

(b) the short- and long-term implications to British Columbia of alternative rates of timber harvesting from the area,

Alternative rates of harvest

The nature of the transition from harvesting old growth to harvesting second growth is a major consideration in determining AACs in many parts of the province. In the short term, the presence of large volumes of older forests often permits harvesting above long-term levels without jeopardizing the sustainability of future timber supply. In keeping with the objectives of good forest stewardship, AACs in British Columbia have been and continue to be determined to ensure that current and medium-term harvest levels will be compatible with a smooth transition toward the usually (but not always) lower long-term harvest level. Thus, timber supply should remain sufficiently stable so that there will be no inordinately adverse impacts on current or future generations. To achieve this, the AAC determined must not be so high as to cause later disruptive shortfalls in supply nor so low as to cause immediate social and economic impacts that are not required to maintain forest productivity and future harvest stability.

Several harvest forecasts would have been possible for the Morice TSA, given the current management regime and assumptions made in the analysis. The assumptions for these

options are discussed in detail in the *February 2002 Morice Timber Supply Area Analysis Report*.

One alternative which tested a non-declining even flow harvest, showed that a harvest level of 1 816 728 cubic metres per year could be maintained for the entire forecast period. The harvest level in this alternative represents a reduction of 7.4 percent from the current AAC in the Morice TSA.

A second alternative showed that an initial harvest level as high as 2 133 100 cubic metres per year could be maintained for three decades before declining to 3 percent below the base case mid-term level between decades 6 to 10.

I have reviewed the alternative harvest forecasts provided and I am satisfied that the harvest flow selected for the base case is consistent with the philosophy outlined earlier and provides a suitable basis from which to evaluate the assumptions applied in the analysis.

Community implications

I have reviewed the information presented in the socio-economic analysis for the Morice TSA, and I am aware of the implications to communities of changes in the harvest levels for the TSA.

I note that more than half of the total employment within the Morice TSA comes from the forest sector and with the exception of Fort St. James and Mackenzie TSAs, the economy is the most forest dependant and one of the least diversified in the province.

Input from the District of Houston expressed how significant the wood supply is to local employment and viability of local communities. From their review of the March 2002 *Information Report*, they also note that only 40% of the total jobs created provincially from the Morice TSA wood supply are located within the TSA. They expressed the view that the community should receive higher employment benefits than that.

Jobs created from the Morice TSA wood supply can be divided into three categories; direct, indirect and induced jobs. Direct jobs are those directly associated with the wood supply and include harvesting, silviculture and processing jobs. Indirect jobs are those jobs supported by direct business purchases of services and induced jobs are those supported by employee purchases.

Not withstands the provincial level of benefit, I note that 71 percent of the direct jobs attributable to the Morice wood supply are located within the TSA, and this represents a high proportion relative to other areas of the province. Many of the indirect jobs associated with harvesting within any TSA are associated with a wide variety of goods and services supplied to the forest sector, with suppliers typically located anywhere within the province. This in part explains why there are employment benefits that accrue outside of the community area.

AAC and actual harvest

Since 1996, the actual harvest level in the Morice TSA has achieved 99 percent of the total AAC for the TSA.

I am mindful that the AAC is being fully utilized in the Morice TSA and that any reductions or increases in the AAC will have proportionate socio-economic implications for local communities.

- (c) the nature, production capabilities and timber requirements of established and proposed timber processing facilities,

Timber processing facilities

I have reviewed the information regarding timber processing facilities, those with tenure and those without, and I am aware of the reliance of timber processing facilities on the volume harvested in the Morice TSA. I note that the capacity of local mills exceeds available wood supply.

- (d) the economic and social objectives of the government, as expressed by the minister, for the area, for the general region and for British Columbia,

Minister's letter and memorandum

The Minister has expressed the economic and social objectives of the Crown for the province in two documents to the chief forester—a letter dated July 28, 1994, (attached as Appendix 3) and a memorandum dated February 26, 1996, (attached as Appendix 4). The letter and memorandum include objectives for forest stewardship, a stable timber supply, and allowance of time for communities to adjust to changes in a managed transition from harvesting old-growth to second-growth forests, so as to provide for community stability.

The Minister stated in his letter of July 28, 1994, that "any decreases in allowable cut at this time should be no larger than are necessary to avoid compromising long-run sustainability." He placed particular emphasis on the importance of long-term community stability and the continued availability of good forest jobs. To this end he asked that the chief forester consider the potential impacts on timber supply of commercial thinning and harvesting in previously uneconomical areas. To encourage this the Minister suggested consideration of partitioned AACs.

I have considered the contents of the letter and memorandum in my determination of an AAC for the Morice TSA.

Local objectives

The Minister's letter of July 28, 1994, suggests that the chief forester should consider important social and economic objectives that may be derived from the public input in the timber supply review where these are consistent with government's broader objectives. Responses were received regarding the information report and data package, and the timber supply and socio-economic analyses. The summary of public input is reproduced in full as Appendix 5.

Public input was received on both the data package and information report, and on the analysis report and public discussion paper. Some of the input was related to considerations outside of my authority to consider under section 8 of the *Forest Act*.

However, local objectives have been an important consideration in my determination of an AAC for the Morice TSA. I have considered all public input received on the timber supply review, and where appropriate I have responded briefly to this input in this rationale.

- (e) abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area.

Unsalvaged losses

Normally in timber supply reviews, unsalvaged losses represent timber volumes destroyed or damaged by catastrophic agents such as fire and wind, or epidemic losses to disease and insect outbreaks. These "conventional" unsalvaged losses are not recovered through salvage operations or accommodated in yield projections. In this analysis however, unsalvaged losses also included volumes from trees killed primarily by bark beetles and recovered through salvage operations, as these volumes are not being charged against the AAC and are not accommodated within yield curves or elsewhere in the analysis. Therefore, the unsalvaged loss figures used in the timber supply analysis reflect "conventional" unsalvaged losses, plus bark beetle killed tree volumes that are salvaged, but not charged against the AAC, henceforth referred to as "unconventional" unsalvaged losses. To accommodate both conventional and unconventional unsalvaged losses, the combined volume losses are added together and accounted for in this analysis.

A summary of information presented to me on each unsalvaged loss element is presented below, followed by discussions with regard to public input and finally my reflection on unsalvaged losses relative to base case assumptions.

1) Losses to fire and wind

District staff reviewed fire and wind loss data for the 5-year period between 1996 and 2000. Very few unsalvaged losses were experienced over that 5-year period for either fire or wind. As a result, district staff reduced unsalvaged losses from fire to 50% of that used in the previous analysis.

Unsalvaged losses from wind were assumed to be the same as those determined for the previous analysis for the first 50 years of the forecast period and were reduced by 50% thereafter, to reflect the belief that younger stands would be more wind-firm.

2) Losses to Mountain Pine Beetle

District staff indicated that for the past 20 years, forest management activities including clearcutting, brood removal, chemical treatments, and fall and burn have been aggressively used to target stands either already attacked or at high risk to mountain pine beetle attack. Helped by favourable access throughout most of the district, few restrictions on timber removal, timely reporting of new infestations,

expedited approval to harvest and a work force geared to harvesting currently attacked and susceptible stands, unsalvaged losses to mountain pine beetle have been small.

As a result of mountain pine beetle management activities, most of the volume impacted or at risk to mountain pine beetle is harvested within the current AAC. Therefore, in the analysis conventional unsalvaged losses to mountain pine beetle consist of 9050 cubic metres per year for management treatments for which volume is not recovered. A further 59 796 cubic metres per year of volume is considered unconventional unsalvaged loss to reflect volume salvaged, but not charged against the AAC (discussed above).

After the first 50 years of the analysis forecast, the unsalvaged losses associated with mountain pine beetle were reduced to reflect the decline in the number of susceptible stands (those over 80 years of age) through harvesting. District staff note that the trend from the latest insect flight data (2001) shows a slight increase (5%) in mountain pine beetle activity from the previous year.

2) Losses to Spruce Beetle

Spruce beetle populations have increased dramatically since the last analysis. As a result, management activities have been aggressively targeting stands attacked or at high risk to spruce beetle for the past three years. The management treatments for spruce beetle are similar to that for mountain pine beetle and the latest flight data for spruce beetle indicates volume losses decreased by 43% between 2000 and 2001. If the current level of infestation continues, or declines, district staff believe that most of the affected volume can be harvested within the current AAC. In the analysis, conventional unsalvaged losses to spruce beetle consist of 293 cubic metres per year, and 30 017 cubic metres per year of unconventional unsalvaged losses.

After the first 50 years of the analysis, the unsalvaged losses due to spruce beetle are reduced to reflect the reduction of susceptible spruce stands through harvesting.

3) Losses to Western Balsam Bark Beetle

Western Balsam bark beetle losses tend to be more widespread and occur more slowly than those from pine and spruce beetles. Although no detailed flight data are collected for western balsam bark beetle at this time, overview information shows the beetle is present in many mature stands.

A cruise style audit (in addition to the inventory audit mentioned previously) was recently completed to see if balsam bark beetle losses were causing balsam stand volumes to fall below inventory estimates, as the inventory was completed prior to current western balsam bark beetle outbreak. Results of the cruise style audit indicate that ground volumes in balsam stands over 100 years of age are similar to inventory estimates. As a result, no inventory volume adjustments are required at this time to reflect western balsam bark beetle losses.

In the analysis, no conventional unsalvaged losses were assumed for western balsam bark beetle. To account for beetle killed trees salvaged that are not charged against

the AAC, 63 703 cubic metres per year, is recognized as unconventional unsalvaged losses to account for this volume in the analysis.

To reflect the cumulative affect of the various agents described above, total unsalvaged losses of 171 959 were modelled for the first 50 years of the analysis. I note that just prior to the release of the analysis, staff became aware that the losses actually totalled 181 859 cubic metres per year. The 9900 cubic metres underestimation of unsalvaged losses was attributable to an arithmetic error, not change in unsalvaged loss estimates. A sensitivity analysis was conducted in which unsalvaged losses were increased for the first 50 years of the analysis to 181 859 cubic metres per year, and no impact was noted on the base case harvest forecast.

Input from licensees suggested that unsalvaged losses were unreasonably high when compared to adjacent TSAs. They felt that grade 3 volume being harvested, and not charged against the AAC (handled as an unconventional unsalvaged loss in this analysis), includes dead wood not killed by beetles and therefore, is at least partially accounted for in yield curves. Therefore adding all grade 3 volume to unsalvaged loss estimates leads to an overestimate of loss. The fact that the inventory audit (see existing volumes) indicated volumes from VDYP were not significantly different from ground measured volumes was thought to support that grade 3 volumes were endemic and already reflected in yield curves.

In consideration of this input, I have discussed epidemic and endemic loss factors present in the Morice TSA with district and regional staff and I have viewed mature forest stands within the TSA from the air. I note the majority of mortality occurring in mature stands appears to be the result of bark beetle attack. This, coupled with the fact that harvesting is concentrated on beetle attacked or at-risk stands, leads me to believe that most of the grade 3 volume being harvested is a result of epidemic beetle damage and thus not reflected in yield curves. Further, I note that the inventory audit is a relatively coarse check of standing volume for the TSA and does not have adequate resolution to detect a volume loss in the magnitude in grade 3 volumes (153 516 cubic metres per year). In addition, the inventory audit suggested that inventory volume within the operable land base might actually be overestimated, although the difference was not statistically significant.

Apart from grade 3 volume harvest, conventional unsalvaged losses for this unit are small at 29 343 cubic metres per year or 1.5% of the AAC.

I have reviewed the information and public input presented to me regarding the unsalvaged losses assumed in the analysis and discussed it with district and regional staff. I accept that grade 3 volume harvest is more catastrophic than endemic and thus was accounted for appropriately in the analysis. I am also satisfied that wind and fire losses have been accounted for appropriately.

I am aware that losses to mountain pine beetle might actually be higher than modelled, as there is no accounting in the analysis for unsalvaged losses beyond the losses incurred for beetle treatments, or harvested as grade 3 volumes. However, I also am aware that losses from spruce beetle could be overestimated, as the grade 3 volume harvest modelled reflected a peak in spruce beetle activity, which now appears to be declining. The extent to which these factors mitigate one another is unknown and would require additional data and analysis than is currently available before any further conclusions could be drawn.

Subsequent to the determination meeting, district staff conducted some additional aerial inspections and it appears that bark beetle activity may be increasing in 2002 beyond what was accounted for in the analysis however, no data is available to support these observations. All of these points illustrate the uncertainty associated with preparing appropriate estimates to account for unsalvaged losses from beetle agents.

I am mindful that the total unsalvaged losses for the Morice TSA reflected in the analysis was 171 959 cubic metres per year for the first 50 years of the forecast, a value that has been noted to understate losses by 9900 cubic metres per year. I also note however, that a sensitivity analysis conducted to test the impact of increasing unsalvaged losses 9900 cubic metres per year had no impact on the base case harvest forecast.

In consideration of the information, and in the absence of any information to quantifiably indicate otherwise, I conclude that the values assumed in the analysis provide a reasonable estimate of unsalvaged losses and are acceptable for this determination.

I encourage district and licensees staff to continue to monitor bark beetle activity and report any significant change in activity to me. I also support attempts to further quantify unsalvaged losses within the Morice TSA before the next analysis.

Review of alternative salvage scenarios

Although harvesting activities have been used effectively to manage the current bark beetle outbreak in the Morice TSA, there remains uncertainty regarding the future spread rate of the epidemic. To address this uncertainty, timber harvesting scenarios were developed to explore the implications of increasing harvest should the epidemic bark beetle activity increase beyond the current level.

I note that harvesting could be increased, if necessary, by up to 50% for a decade to address increased bark beetle activity. In order to attain this increased harvest however, green-up requirements cannot be fully met during the decade of elevated harvest and in the long-term the harvest level is reduced by 1.9 percent relative to the base case harvest forecast.

For now I conclude that the current level of harvest, reflected in the base case, is adequate for the management of the bark beetle epidemic. If the level of beetle activity increases, as district staff indicate could be the case, it will be addressed in a future decision. My review of the information indicates to me that harvest levels in the Morice TSA could be increased for a fixed time period if bark beetle activity increases without jeopardizing the productivity of the forest.

Reasons for Decision

In reaching my AAC determination for the Morice TSA, I have considered all of the factors presented to me, and I have reasoned as follows.

The base case prepared as part of the timber supply analysis projected that the initial harvest level of 1 961 117 cubic metres per year could be maintained for four decades before declining by 8 percent to a mid- and long-term level of 1 803 000 cubic metres per year.

Section 8 of the *Forest Act* requires me to consider a number of factors in the determination of an AAC for a timber supply area. In determining an AAC, my considerations identify factors which, when considered separately, indicate that the timber supply may actually be greater or less than that projected in the base case. Some factors can be quantified and their impacts assessed with some reliability. Others may influence timber supply by introducing an element of risk or uncertainty to the decision, but cannot be reliably quantified at the time of the determination.

I am satisfied that the assumptions applied in the base case analysis for the majority of the factors applicable to the Morice TSA were appropriate. Following is my consideration of those factors that I feel have not been fully accounted for in the base case and have implications to the timber supply.

I am aware of three factors that indicate that the timber supply, as projected in the base case, may be underestimated, as follows:

- 1) *environmentally sensitive areas* – as a result of using older ESA data rather than TSM mapping to identify areas of sensitive soils, I accept that timber supply has been underestimated across the full planning horizon by about 1.5 percent.
- 2) *site productivity* - site productivity of second-growth forests is likely underestimated due to site index measurements taken from existing old growth forests. If provincial trends are found to apply to the Morice TSA, the underestimation could result in harvest levels that are up to 13 percent higher than those in the base case in the mid- to long-term.
- 3) *Silviculture systems and treatments* – It is appropriate to take into account the timber supply impacts of silvicultural treatments on 4339 hectares of stands older than 34 years. This results in mid- and long-term harvest levels that are 0.2 percent higher than the base case.

I have also identified four factors that indicate that the base case harvest projection likely overestimates timber supply. These factors are as follows:

- 1) *existing stand volume estimates* – It is appropriate to take into account the timber supply implications of inventory depletions not reflecting recent harvesting or brood removal activities. This will result in the mid-term harvest level reduction of 8.0 percent occurring in 26 years rather than the 40 years predicted in the base case.
- 2) *Not-satisfactorily restocked areas* – I accept that yields from untreated backlog NSR stands are overstated in the analysis and this results in a reduction of about 0.2 percent in the mid-term harvest level.
- 3) *Identified Wildlife Management strategy* – I accept that the implementation of the IWMS will result in an impact on the timber harvesting land base of up to 1 percent over the entire planning horizon.
- 4) *Recreation areas* – I accept that there will be some additional timber supply impacts associated with high value recreation areas. This results, in a small downward pressure on timber supply over the full planning horizon.

In addition to the factors described above, I note that the pending completion of the LRMP, scheduled to be complete by March 2004, could also influence timber supply. If currently proposed protected areas are endorsed by the LRMP, then it could result in an additional 1.9 percent reduction in the timber harvesting land base for the TSA. However, consistent with my guiding principles, I cannot take these implications into account until government actually decides upon and implements protected area decisions.

Having reviewed the information above, I conclude as follows. The cumulative impact of those factors that can be quantified indicating that timber supply has been overestimated in the base case analysis, is about 1 percent in the short term. In addition, recreation value management further constrains short-term timber supply, but to a degree that cannot be quantified. Conversely, the cumulative impacts of those factors acting to increase short-term timber supply is about 1.5% which roughly mitigates the factors acting to decrease short-term timber supply.

In the mid-term, timber supply will be reduced due to inventory depletions not being up to date and the small overstatement of yield from some not-sufficiently restocked areas. These downward influences on timber supply in the mid-term will likely be more than counteracted by the underestimation of site productivity in regenerating stands.

When I examine the factors influencing the longer-term timber supply, both acting to increase and decrease supply, I note that on balance they generally act to increase timber supply by up to 13 percent.

I am aware that bark beetle activity has the potential to further influence short-term timber supply in the Morice TSA. Management activities to date seem to have been successful at reducing the spread and minimizing the volume losses due to bark beetles. If the situation were to change significantly, as district staff indicate might be the case for 2002, it is possible that I will revisit this decision sooner than required by legislation.

In consideration of the foregoing information, I am confident that current harvest levels in the Morice TSA can be maintained in the short term. In addition, I find it likely that the projected mid-term reduction will be less than indicated in the base case forecast, and that longer-term timber supply is more favourable than indicated in the base case. Finally, I have accounted for the additional volume issued to woodlots since the last determination. I am satisfied that an appropriate harvest level for the Morice TSA at this time is 1 961 117 cubic metres per year.

Determination

I have considered and reviewed all the factors as documented above, including the risks and uncertainties of the information provided. It is my determination that a timber harvest level that accommodates objectives for all forest resources during the next five years, that reflects current management practices as well as the socio-economic objectives of the Crown, can be best achieved in the Morice TSA by establishing an AAC of 1 961 117 cubic metres, effective October 1, 2002. This AAC excludes the area and volume issued to woodlot licences since the previous determination, and is otherwise unchanged from the current AAC.

If additional significant new information is made available to me, or major changes occur in the management assumptions upon which I have predicated this decision, then I am prepared to revisit this determination sooner than the five years required by legislation.

Implementation

In the period following this decision and leading to the subsequent determination, I encourage BCFS staff to undertake the tasks and studies noted below that I have also mentioned in the appropriate sections of this rationale document. I recognize that the ability of staff to undertake these projects is dependent on available staff resource time and funding. These projects are, however, important to help reduce the risk and uncertainty associated with key factors that affect the timber supply in the Morice TSA. I recommend that district staff:

- work with licensees to complete Terrain Stability Mapping for the remainder of the TSA and assess performance in various mapping categories for use in the next analysis;
- continue to monitor harvesting performance on low productivity sites;
- continue to collect and monitor road, trail and landing data for the TSA;
- work with licensees to bring inventory depletions up-to-date;
- collect data on site productivity from stands within the TSA;
- develop a strategy for critical and at risk wildlife management;
- evaluate the amount of area being retained for riparian habitat management;
- monitor harvesting performance relative to the new recreation inventory classifications; and
- continue work to monitor bark beetle activity and further quantify unsalvaged losses within the Morice TSA.



Larry Pedersen
Chief Forester

September 12, 2002

Appendix 1: Section 8 of the *Forest Act*

Section 8 of the Forest Act, Revised Statutes of British Columbia 1996, reads as follows:

Allowable annual cut

- 8(1) The chief forester must determine an allowable annual cut at least once every 5 years after the date of the last determination, for
- (a) the Crown land in each timber supply area, excluding tree farm licence areas, community forest areas and woodlot licence areas, and
 - (b) each tree farm licence area.
- (2) If the minister
- (a) makes an order under section 7 (b) respecting a timber supply area, or
 - (b) amends or enters into a tree farm licence to accomplish the result set out under section 39 (1) (a) to (d),
- the chief forester must make an allowable annual cut determination under subsection (1) for the timber supply area or tree farm licence area
- (c) within 5 years after the order under paragraph (a) or the amendment or entering into under paragraph (b), and
 - (d) after the determination under paragraph (c), at least once every 5 years after the date of the last determination.
- (3) If
- (a) the allowable annual cut for the tree farm licence area is reduced under section 9 (3), and
 - (b) the chief forester subsequently determines, under subsection (1) of this section, the allowable annual cut for the tree farm licence area,
- the chief forester must determine an allowable annual cut at least once every 5 years from the date the allowable annual cut under subsection (1) of this section is effective under section 9 (6).
- (3.1) If, in respect of the allowable annual cut for a timber supply area or tree farm licence area, the chief forester considers that the allowable annual cut that was determined under subsection (1) is not likely to be changed significantly with a new determination, then, despite subsections (1) to (3), the chief forester
- (a) by written order may postpone the next determination under subsection (1) to a date that is up to 10 years after the date of the relevant last determination, and
 - (b) must give written reasons for the postponement.
- (3.2) If the chief forester, having made an order under subsection (3.1), considers that because of changed circumstances the allowable annual cut that was determined under subsection (1) for a timber supply area or tree farm licence area is likely to be changed significantly with a new determination, he or she
- (a) by written order may rescind the order made under subsection (3.1) and set an earlier date for the next determination under subsection (1), and
 - (b) must give written reasons for setting the earlier date.
- (4) If the allowable annual cut for the tree farm licence area is reduced under section 9 (3), the chief forester is not required to make the determination under subsection (1) of

this section at the times set out in subsection (1) or (2) (c) or (d), but must make that determination within one year after the chief forester determines that the holder is in compliance with section 9 (2).

- (5) In determining an allowable annual cut under subsection (1) the chief forester may specify portions of the allowable annual cut attributable to
 - (a) different types of timber and terrain in different parts of Crown land within a timber supply area or tree farm licence area, and
 - (b) different types of timber and terrain in different parts of private land within a tree farm licence area,
 - (c) [Repealed 1999-10-1.]
- (6) The regional manager or district manager must determine an allowable annual cut for each woodlot licence area, according to the licence.
- (7) The regional manager or the regional manager's designate must determine a rate of timber harvesting for each community forest agreement area, in accordance with
 - (a) the community forest agreement, and
 - (b) any directions of the chief forester.
- (8) In determining an allowable annual cut under subsection (1) the chief forester, despite anything to the contrary in an agreement listed in section 12, must consider
 - (a) the rate of timber production that may be sustained on the area, taking into account
 - (i) the composition of the forest and its expected rate of growth on the area,
 - (ii) the expected time that it will take the forest to become re-established on the area following denudation,
 - (iii) silviculture treatments to be applied to the area,
 - (iv) the standard of timber utilization and the allowance for decay, waste and breakage expected to be applied with respect to timber harvesting on the area,
 - (v) the constraints on the amount of timber produced from the area that reasonably can be expected by use of the area for purposes other than timber production, and
 - (vi) any other information that, in the chief forester's opinion, relates to the capability of the area to produce timber,
 - (b) the short and long term implications to British Columbia of alternative rates of timber harvesting from the area,
 - (c) the nature, production capabilities and timber requirements of established and proposed timber processing facilities,
 - (d) the economic and social objectives of the government, as expressed by the minister, for the area, for the general region and for British Columbia, and
 - (e) abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area.

Appendix 2: Section 4 of the *Ministry of Forests Act*

Section 4 of the *Ministry of Forests Act* (consolidated 1988) reads as follows:

Purposes and functions of ministry

4. The purposes and functions of the ministry are, under the direction of the minister, to
- (a) encourage maximum productivity of the forest and range resources in British Columbia;
 - (b) manage, protect and conserve the forest and range resources of the government, having regard to the immediate and long term economic and social benefits they may confer on British Columbia;
 - (c) plan the use of the forest and range resources of the government, so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realization of fisheries, wildlife, water, outdoor recreation and other natural resource values are coordinated and integrated, in consultation and cooperation with other ministries and agencies of the government and with the private sector;
 - (d) encourage a vigorous, efficient and world competitive timber processing industry in British Columbia; and
 - (e) assert the financial interest of the government in its forest and range resources in a systematic and equitable manner.

Documents attached:

Appendix 3: Minister of Forests' letter of July 28, 1994

Appendix 4: Minister of Forests' memo of February 26, 1996

Appendix 5: Summary of Public Input



File: 10100-01

JUL 28 1994

John Cuthbert
Chief Forester
Ministry of Forests
595 Pandora Avenue
Victoria, British Columbia
V8W 3E7

Dear John Cuthbert:

Re: Economic and Social Objectives of the Crown

The *Forest Act* gives you the clear responsibility for determining Allowable Annual Cuts, decisions with far-reaching implications for the province's economy. The *Forest Act* provides that you consider the social and economic objectives of the Crown, as expressed by me, in making these determinations. The purpose of this letter is to provide this information to you.

The social and economic objectives expressed below should be considered in conjunction with environmental considerations as reflected in the Forest Practices Code, which requires recognition and better protection of non-timber values such as biodiversity, wildlife and water quality.

The government's general social and economic objectives for the forest sector are made clear in the goals of the Forest Renewal Program. In relation to the Allowable Annual Cut determinations you must make, I would emphasize the particular importance the government attaches to the continued availability of good forest jobs and to the long-term stability of communities that rely on forests.

Through the Forest Renewal Plan, the government is taking the steps necessary to facilitate the transition to more value-based management in the forest and the forest sector. We feel that adjustment costs should be minimized wherever possible, and to this end, any decreases in allowable cut at this time should be no larger than are necessary to avoid compromising long-run sustainability.

.../2

Province of
British Columbia

Minister of
Forests

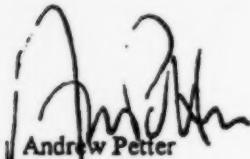
Parliament Buildings
Victoria, British Columbia
V8V 1X4

John Cuthbert
Page 2

In addition to the provincial perspective, you should also consider important local social and economic objectives that may be derived from the public input on the Timber Supply Review discussion papers where these are consistent with the government's broader objectives.

Finally, I would note that improving economic conditions may make it possible to harvest timber which has typically not been used in the past. For example, use of wood from commercial thinnings and previously uneconomic areas may assist in maintaining harvests without violating forest practices constraints. I urge you to consider all available vehicles, such as partitioned cuts, which could provide the forest industry with the opportunity and incentive to demonstrate their ability to utilize such timber resources.

Yours truly,



Andrew Petter
Minister



Province of
British Columbia

OFFICE OF THE
MINISTER

Ministry of
Forests



MEMORANDUM

File: 16290-01

February 26, 1996

To: Larry Pedersen
Chief Forester

From: The Honourable Andrew Petter
Minister of Forests

Re: The Crown's Economic And Social Objectives Regarding Visual Resources

Further to my letter of July 29, 1994, to your predecessor, wherein I expressed the economic and social objectives of the Crown in accordance with Section 7 of the *Forest Act*, I would like to elaborate upon these objectives as they relate to visual resources.

British Columbia's scenic landscapes are a part of its heritage and a resource base underlying much of its tourism industry. They also provide timber supplies that are of significant economic and social importance to forest industry dependent communities.

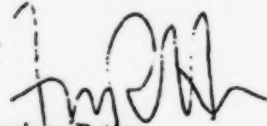
Accordingly, one of the Crown's objectives is to ensure an appropriate balance within timber supply areas and tree farm licence areas between protecting visual resources and minimizing the impact of such protection measures on timber supplies.

As you know, I have directed that the policy on management of scenic landscapes should be modified in light of the beneficial effects of the Forest Practices Code. In general, the new policy should ensure that establishment and administration of visual quality objectives is less restrictive on timber harvesting. This change is possible because alternative harvesting approaches as well as overall improvement in forest practices will result in reduced detrimental impacts on visually sensitive areas. Also, I anticipate that the Forest Practices Code will lead to a greater public awareness that forest harvesting is being conducted in a responsible, environmentally sound manner, and therefore to a decreased public reaction to its visible effects on the landscape. In relation to the Allowable Annual Cuts determinations that you make, please consider the effects that the new policy will have in each Timber Supply Area and Tree Farm Licence.

Larry Pedersen
Page 2

In keeping with my earlier letter, I would re-emphasize the Crown's objectives to ensure community stability and minimize adjustment costs as the forest sector moves to more value-based management. I believe that the appropriate balance between timber and visual resources will be achieved if decisions are made consistent with the ministry's February 1996 report *The Forest Practices Code: Timber Supply Analysis*.

Finally, in my previous letter I had asked that local economic and social objectives be considered. Please ensure that local views on the balance between timber and visual resources are taken into account within the context of government's broader objectives.

A handwritten signature in dark ink, appearing to read 'Andrew Petter', is positioned above the printed name.

Andrew Petter
Minister of Forests

+

Morice Timber Supply Area Timber Supply Review

Summary of Public Input

BC Ministry of Forests

Morice Forest District
Bag 2000
2430 Butler Ave.
Houston, BC V0J 1Z0

September, 2002

This is a summary of the public input received on the Timber Supply Review in the Morice Timber Supply Area. This summary does not assess the feasibility or validity of the input or whether it relates to the clearly defined mandate of the chief forester in the allowable annual cut determination.

Morice Timber Supply Area

Background

As part of the review of timber supply in the Morice Timber Supply Area (TSA), two opportunities were provided for public input. The first followed release of the Morice TSA *Data Package and Information Report* in March 2001. The *Information Report* was a non-technical summary of the draft data and management assumptions that were to be applied in reviewing the timber supply for the Morice TSA. A 30-day review period, ending April 30, 2001, was provided for the public to comment on these documents.

On February 14, 2002, the British Columbia Forest Service released the *2002 Morice Timber Supply Area Analysis Report and Public Discussion Paper*. The public was encouraged to review and comment on the accuracy of the information in these documents and to provide additional information during the 45-day review period that ended April 1, 2002.

This report summarizes the input received during both public review periods. This information was provided to the chief forester for his consideration when he reviewed the allowable annual cut (AAC) for the Morice TSA. The first section of this summary outlines the public review process implemented by the Forest Service, and describes the types of public input received. The second section summarizes the public input in sufficient detail to indicate the range of input received. The original submissions (with personal identifiers removed in accordance with the *Freedom of Information and Protection of Privacy Act*) can be reviewed at the Morice Forest District office in Houston.

Public Review Process and Response

Staff from the Morice Forest District actively solicited public input on the Timber Supply Review in the Morice TSA through the

following actions:

- 46 letters were sent to stakeholders in the TSA, informing them about the Timber Supply Review and who to contact for more information.
- 20 copies of the *Data Package, Information Report, Analysis Report and Public Discussion Paper* were mailed to stakeholders in the TSA, including First Nations, licensees, local governments and environmental groups. Meetings or presentations were offered.
- the *Data Package and Analysis Report* were available at the district office and the Prince Rupert regional office in Smithers. About four copies of each document were picked up.
- newspaper advertisements were placed, advising of the availability of all documents for review by the public.
- referrals were made to the Ministry of Forests website where documents were available to download.
- on April 17, 2001, a presentation was made at the District of Houston Council meeting. Approximately 10 people attended.

The forest district office received five written submissions on the *Data Package* and one submission on the *Analysis Report* (see Appendix 1).

Public Input

In this section, public input on the information presented in the Timber Supply Review documents for the Morice TSA is summarized under the following headings:

- Data Package (and Information Report)
- Timber Supply Area Analysis Report (and Public Discussion Paper)
- Other comments

Morice Timber Supply Area

Data Package

Operable Land Base

The submissions from Houston Forest Products and Canadian Forest Products (Canfor) say that a static elevation line (i.e., 1360 metres) should not define operability. The companies say the following factors should be used:

- economics and the merchantability of stands.
- the ability of the site to produce a new forest.
- criteria for minimum volume and age.

The companies say that some harvesting has occurred above 1360 metres and as access improves, more harvesting will occur above this line.

The submission from the District of Houston questions if inoperable land removed from the timber harvesting land base (THLB) will be included in the 20 per cent of protected areas.

Uneconomic Sites

Canfor and Houston Forest Products question the exclusion of certain areas from the THLB due to economic constraints (very high development costs and low value stands). The companies say not enough economic information is provided to justify permanently removing these areas, and Canfor notes they were included in the THLB during the previous Timber Supply Review. Both companies suggest these areas remain in the THLB for the base case, and a sensitivity analysis be done on excluding them, with enough detailed criteria provided to justify why they were excluded (e.g., steep slopes, road distances, THLB available).

Non-Forest Land Base

Canfor and Houston Forest Products say areas classified as non-forest should be checked to see what proportion actually contains forest. The companies maintain that any areas with trees should be included in the forested land

base because even if they do not contribute to timber supply, they would contribute to meeting biodiversity, seral stage and green-up requirements.

Environmentally Sensitive Areas (ESAs)

Houston Forest Products and Canfor question the logic of not replacing ESA classifications with terrain stability mapping to identify areas of sensitive soils. Canfor, after comparing 96 mapsheets with both mapping and ESA designations, concluded that the former more accurately reflected areas with steep terrain and sensitive soils. Canfor says terrain stability mapping, where available, should replace ESA designations and the 100 per cent netdown should be applied to unstable terrain only. According to Canfor, this would reduce the land base by only 4,190 hectares instead of 47,071 hectares, as contemplated in the *Data Package*.

With regard to high elevation, flat, wet sites (Es2 sensitive soils), the two companies say better defined criteria are needed to identify these sites and to determine if they are captured by other netdowns (e.g., low growing potential, non-merchantability). Otherwise, the defined elevation and slope characteristics should be used to determine the netdown.

Low Productivity Sites

Houston Forest Products says the minimum volume criteria for defining low productivity sites should not be affected by stand age, and that stands meeting the minimum volume criteria have operationally been considered merchantable regardless of age. The company provides details of an analysis they conducted of harvest activities over the past 19 years that showed an additional 12 hectares per year could be added to the THLB to account for harvesting in low sites.

Non-Merchantable Forest Types

Houston Forest Products says all of the species listed in Table 6 (Non-Merchantable Forest Types) are presently marketable. The company

Morice Timber Supply Area

says if these types do not fall within the low site definition, they could be included in the THLB and suggests a sensitivity analysis to determine what volume these types could contribute.

Roads, Trails and Landings

Houston Forest Products and Canfor question the netdown for skid trails, noting that it is current practice to include in-block skid trails as part of the area to be reforested and they are therefore not considered permanent access structures. In addition, the companies maintain that operational adjustment factors would account for any trails used for beetle operations within managed stands. Canfor says the area of existing and future trails should not be removed from the THLB.

With regard to landings, the two companies note the significant increase in roadside logging in recent years, and say the area removed from the THLB to account for future landings should be greatly reduced or eliminated.

Forest Cover Inventory

Canfor and Houston Forest Products express concern that the analysis may be based on forest cover maps that have been updated to various years (1993-1998) but that may not accurately represent the current age class distribution and growth resulting from disturbance and silvicultural activities.

Expected Rate of Growth

Houston Forest Products and Canfor question the application of managed stand yield tables only to stands younger than 35 years. They note that management activities that should increase growth, such as juvenile spacing and fertilization, have occurred on stands older than 35 years. These treated stands should be identified from silviculture treatment histories and should be analyzed separately, according to the companies.

Canfor notes that in the previous Timber Supply Review, site index adjustments were

applied to pine stands in a variant of the Sub-Boreal Spruce Zone. The company asks why this variant was excluded from the current analysis, and provides details of a review of silviculture prescriptions for 110 blocks located in this variant.

Recreation Values

The District of Houston asks if the statement in the *Data Package* that only the "provincially significant" recreation designation would preclude harvesting is due to the fact that practically all of the TSA is used for recreation, utilizing logging roads for access.

Biodiversity

Canfor expresses the opinion that because landscape unit objectives have not been approved, biodiversity emphasis options and seral stage requirements should be analyzed in a sensitivity analysis and not in the base case. The company says this will make it easier to evaluate whether the requirements will be within the timber supply impacts outlined in government policy.

Visual Quality

Houston Forest Products says the *Data Package* doesn't seem to distinguish between the various classes of Known Scenic Areas, and expresses the opinion that Class 1 scenic areas should be managed differently than Class 2 and 3.

Canfor says the required vegetation height for visual quality green-up should take into account the slope of the area, in accordance with *Procedures for Factoring Visual Resources into Timber Supply* (March 5, 1998). The company says their review indicates that the green-up height should be about 4.4 metres, when the weighted average slope is calculated.

Riparian Management

Canfor and Houston Forest Products raise various concerns with regard to riparian management as presented in the *Data Package*. Their comments include:

Morice Timber Supply Area

- current management on S1 and S2 streams includes the option of harvesting, contrary to the *Data Package's* statements. Canfor notes their approved Forest Development Plan includes clearcutting in riparian management areas where the windthrow hazard is low. S1 and S2 streams should be treated the same as others.
- there are no Riparian Reserve Zones (RRZs) on S4 streams, so the 15 per cent removed from the THLB does not reflect current practice.
- the gross area for RRZs of 70,169 hectares seems excessive. It appears that the area of rivers, lakes and wetlands have been included. Canfor says their information indicates the gross area of RRZs is 14,000 hectares.
- will the analysis account for the 30-metre reserves on streams within basins that have temperature concerns in the Madina landscape unit? This is current practice.

Harvest Priority

Canfor says the *Data Package* should provide more detail on how harvesting will be prioritized using the latest Forest Development Plans. The company says this is a concern because the analysis is non-spatial.

Deferrals

Canfor says a sensitivity analysis should be done to evaluate the timber supply impact of removing all of the proposed protected areas from the THLB. This would indicate the maximum potential downward pressure on the timber supply due to potential land use planning decisions.

Socio-Economic Factors

The District of Houston notes the statement in the *Data Package* that about 40 per cent of the harvesting, silviculture and processing activities associated with the Morice harvest are located in the TSA. The district says the area should keep more than 40 per cent of jobs.

The District of Houston provides the

following local objectives:

- the community needs to be viable and sustainable.
- there must be enough wood supply to keep residents employed.
- protection of species-at-risk will result in the loss of areas to special interest and other groups.
- value-added businesses must be expanded and supported to increase employment if the AAC decreases.

Unsalvaged Losses

Three forest industry submissions say the estimates of unsalvaged losses are unrealistically high.

Fraser Lake Sawmills says the loss estimates should be reduced by half for the following reasons:

- harvesting has been focussed on attacked and high-risk stands, and an aggressive small-scale sanitation program has been implemented.
- the majority of the TSA has well-developed access enabling salvage to occur quickly, reducing potential losses.
- comparable TSAs have much lower losses. For example, the Lakes TSA has significantly higher levels of infestation but predicts only 2.2 per cent of the current AAC will be unsalvaged losses.

Houston Forest Products and Canfor express the opinion that the overestimate of unsalvaged losses may result from the use of grade 3 volumes to estimate losses. They make the following points:

- grade 3 volumes include all dead wood, not just logs killed by bark beetles. How were volumes caused by other factors accounted for?
- this volume is already accounted for in the loss factors used in modelling growth and yield.
- grade 3 volumes have increased because there is now a manufacturing facility to utilize the material, not because unsalvaged

Morice Timber Supply Area

- losses have increased due to the bark beetle.
- just because grade 3 volumes are not charged against the AAC is not a sufficient rationale to include these volumes as unsalvaged losses.

Canfor says the analysis should not use grade 3 volumes to estimate unsalvaged losses, but should use the other method outlined in the *Data Package*.

Houston Forest Products suggests the following factors may also contribute to the overestimate of losses:

- the accuracy of overview flights used to estimate mountain pine beetle losses needs to be verified using ground checks, as the flight data may contain errors due to miscounting of beetle trees.
- with regard to spruce bark beetle attacks, it is very difficult to estimate gray attack spruce from the air, and the margin of error needs to be established by comparing air estimates and ground checks.

Timber Supply Area Analysis Report

Forest Inventory

Canfor expresses concern about how information from their Forest Development Plans (FDPs) is used in the analysis. The company points out the following:

- FDP block boundaries only show the outside boundary, not the area to be harvested.
- the year of harvest is not indicated unless it's critical to other forest resources.
- the FDP status is not included in their spatial coverage.

Canfor says the FDP information used in the timber supply analysis may not accurately reflect their proposed harvesting plans, and says they expected more detail on how their data was incorporated into the analysis.

Landscape Biodiversity Requirements

Canfor expresses concern with how the non-contributing forest land base is modeled with regard to meeting old growth biodiversity requirements. The company says assuming that non-contributing stands younger than 240 years will reach a maximum age of 240 years (due to fire or pest activity) is reasonable for natural disturbance type 3 (NDT3) where frequent stand-initiating events occur and forests are considered old at 140 years.

However, Canfor says this assumption is not applicable to NDT2. The company says forests older than 240 years currently exist and fire suppression and insect control increase the probability of older stands developing. Canfor suggests the use of a weighted average age to better approximate the maximum age the average stand might achieve in NDT2, saying this would allow for old growth in these non-contributing areas to contribute to meeting old growth requirements.

Canfor also notes that in the discussion of landscape level biodiversity and the maintenance of old forests, it would have been helpful to clarify that 71 per cent of the TSA is in NDT3 and 29 per cent is in NDT2.

Forest Cover Requirements – Telkwa Caribou Recovery Area

Canfor says the *Analysis Report* is unclear about how forest cover requirements are applied in the Telkwa Caribou Recovery Area, specifically whether they apply to the forested land base (current practice) or to the timber harvesting land base only. Canfor says the base case may, as a result, have underestimated the timber available in the recovery area.

Visually Sensitive Areas

Canfor says their experience in harvesting in visually sensitive areas indicates that the base case analysis is conservative in modeling the amount of harvesting that can occur. The company says that because slope was not considered, non-visible areas within these visually sensitive areas are being more

Morice Timber Supply Area

constrained than necessary.

Unsalvaged Losses

Canfor maintains that unsalvaged losses are overestimated in the timber supply analysis, and refer to the comments they made on the *Data Package*. The company is of the opinion that licensees are doing a better job of harvesting potential losses in this TSA than the base case analysis accounts for, and this should result in a better timber supply than indicated.

Other Comments

Four submissions comment on factors or issues other than those specifically covered by Timber Supply Review documents. These comments are summarized in this section.

First Nations considerations

The Office of the Wet'suwet'en expressed concern that continuing timber harvesting within Wet'suwet'en territories, particularly at low elevation, is significantly affecting Wet'suwet'en culture. The Wet'suwet'en note that they want to conduct an inventory of the cultural heritage remaining in their territories so they can assess the adequacy of management activities related to that cultural heritage.

The Wet'suwet'en also note that they are opposed to harvesting in the Owen Lake area and that they submitted a petition in the 1980's to stop development in that area. The Wet'suwet'en point out that there has been some harvesting throughout the petition area to deal with bark beetle control issues but, apart from this limited development has occurred.

Timber Supply Review Process

Canfor says that the *Data Package* should not be released until the timber harvesting land base and the analysis unit definitions are finalized, as this would elicit more meaningful comment. The company identifies several sections that they say did not have enough detail about how assumptions were determined, making it hard to evaluate them.

Houston Forest Products asks if they will have the chance to review the final definitions of the analysis units before the final runs are completed.

Harvest Levels

Canfor expresses the opinion that the AAC can be maintained perhaps even longer than shown by the base case, and also says that the current mountain pine beetle activity in the TSA can be handled within the current AAC. The company does not advocate increasing the AAC unless control of bark beetles is required. Canfor also notes that the Morice Lakes Innovative Forest Practices Agreement project is actively working to identify positive impacts to timber supply from improved site productivity estimates, genetically improved stock, new harvesting systems, and intensive silviculture.

Appendix 1

Submissions received by the Morice Forest District

Submissions received on the Data Package

Local government

District of Houston

Forest industry

Houston Forest Products Co.

Canadian Forest Products Ltd.

Fraser Lake Sawmills

First Nations

Office of the Wet'suwet'en

Submissions received on the Timber Supply Analysis Report

Forest industry

Canadian Forest Products Ltd.